FRIEDRICH
1883

Room Air Conditioner
SVC MANUAL(General)

DUCTLESS SPLIT SYSTEMS

CAUTION

Before Servicing the unit, read the safety precautions in General SVC manual.
Only for authorized service personnel.

THE EXPERTS IN ROOM AIR CONDITIONING

960-914-06

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Part 1 General Information

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1. Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠**WARNING**	This symbol indicates the possibility of death or serious injury.
⚠**CAUTION**	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

	Be sure not to do.
	Be sure to follow the instruction.
	Dangerous Voltage

1.1 Cautions in Repair

⚠**WARNING**	
	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair.Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This high voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
	Do not touch the discharging refrigerant gas during the repair work. The discharging refrigerant gas.The refrigerant gas can cause frostbite.
	Release the refrigerant gas completely at a well-ventilated place first. Otherwise, when the pipe is disconnected, refrigerant gas or refrigerating machine oil discharges and it Can cause injury.
	When the refrigerant gas leaks during work, perform ventilation. If the refrigerant gas comes in contact with a fire, poisonous gas generates. A case of leakage of the refrigerant and the closed room full with gas is dangerous because a shortage of oxygen occurs. Be sure to perform ventilation.
	When removing the front panel or cabinet, execute short-circuit and discharge between high voltage capacitor terminals. If discharge is not executed, an electric shock is caused by high voltage resulting in a death or injury.
	Do not turn the air-conditioner ON or OFF by plugging or unplugging the power plug. There is risk of fire or electrical shock.

	Do not use a defective or underrated circuit breaker. Use the correctly rated breaker and fuse. Otherwise there is a risk of fire or electric shock.
	Install the panel and the cover of control box securely. Otherwise there is risk of fire or electric shock due to dust, water etc.
	Indoor/outdoor wiring connections must be secured tightly and the cable should be routed properly so that there is no force pulling the cable from the connection terminals. Improper or loose connections can cause heat generation or fire.
	Do not touch, operate, or repair the product with wet hands. Holding the plug by hand when taking out. Otherwise there is risk of electric shock or fire.

⚠CAUTION	
	Do not turn on the breaker when the front panel and cabinet are removed.
	Be sure to ground the air conditioner with an earthing conductor connected to the earthing terminal.
	Conduct repair works after checking that the refrigerating cycle section has cooled down sufficiently. Otherwise, working on the unit, the hot refrigerating cycle section can cause burns.
	Do not tilt the unit while removing panels. Otherwise, the water inside the unit can spill and wet floor.
	Do not use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.
	Be sure to turn off power switch before connecting or disconnecting connector, or parts damage may be occur.

1.2 Inspections after Repair

⚠WARNING	
	Check to see if the power cable plug is not dirty or loose. If the plug is dusty or loose it can cause an electrical shock or fire.
	Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances. otherwise, it can cause an electrical shock, excessive heat generation or fire.
	Do not insert hands or other objects through the air inlet or outlet while the product is operating. There are sharp and moving parts that could cause personal injury.
	Do not block the inlet or outlet of air flow. It may cause product failure

⚠CAUTION	
	Check to see if the parts are mounted correctly and wires are connected. Improper installation and connections can cause an electric shock or an injury.
	Check whether the installation platform or frame has corroded. Corroded installation platform or frame can cause the unit to fall, resulting in injury.
	Be sure to check whether the earth wire is correctly connected.
	After the work has finished, be sure to do an insulation test to check whether the resistance is 2[Mohm] or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.
	Check the drainage of the indoor unit after the repair. If drainage is faulty the water may enter the room and wet floor.

2. Nomenclature

2.1 Global Model Name

A	S	-	W	1	2	6	B	M	S	0
1	2	-	3	4	5	6	7	8	9	10

Code	Type	Code of Model	Meaning
1	Production Center, Refrigerant	A~Z	L: Chang-won R22 A: Chang-won R410A U: Tianjin R410A
2	Product Type	A~Z	S: Split Type Air Conditioner
3	Cooling/Heating/Inverter	A~Z	C: Cooling Only H: Heat Pump X: C/O + E/Heater Z: H/P + E/Heater V: AC Inverter C/O N: AC Inverter H/P Q: DC Inverter C/O W: DC Inverter H/P
4, 5	Capacity	0~9	Cooling/Heating Capacity Ex. "09" → 9,000 Btu/h
6	Electric Range	1~9 A~Z	1: 115V/60Hz 2: 220V/60Hz 3: 208-230V/60Hz 5: 200-220V/50Hz 6: 220-240V/50Hz 7: 110V, 50/60Hz
7	Chassis	A~Z	Name of Chassis
8	Look	A~Z	Look, Color (Artcool Model)
9	Function	A~Z	
10	Serial No.	1~9	Model Development Serial No.

Basic	A
Basic+4Way	B
Basic+Deodorizing Filter (Carbon filter)	C
Plasma+(A/changeove)+A/clean+2Way+Ion	E
Plasma+(A/changeove)+A/clean+4way+Ion+Lamp	F
Plasma+(A/changeove)+A/clean+Low A	G
Plasma+(A/changeove)+A/clean+4way+Low A	H
Plasma+(A/changeove)+A/clean	L
Plasma+(A/changeove)+A/clean+4way	M
Plasma+(A/changeove)+A/clean+PTC	N
Plasma+(A/changeove)+Autoclean+4way+PTC	P
Plasma+(A/changeove)+A/clean+4way+Low A+PTC	Q
Smart(Robot) Cleaning	R
Eco eye+Plasma+Allergy Filter+4way	S
Plasma+Allergy Filter+4way	U
Allergy Filter+4way	V
Allergy Filter+2way	W
Basic+Low Ambient	Y
Basic+(A/clean)+4way+Low A	Z

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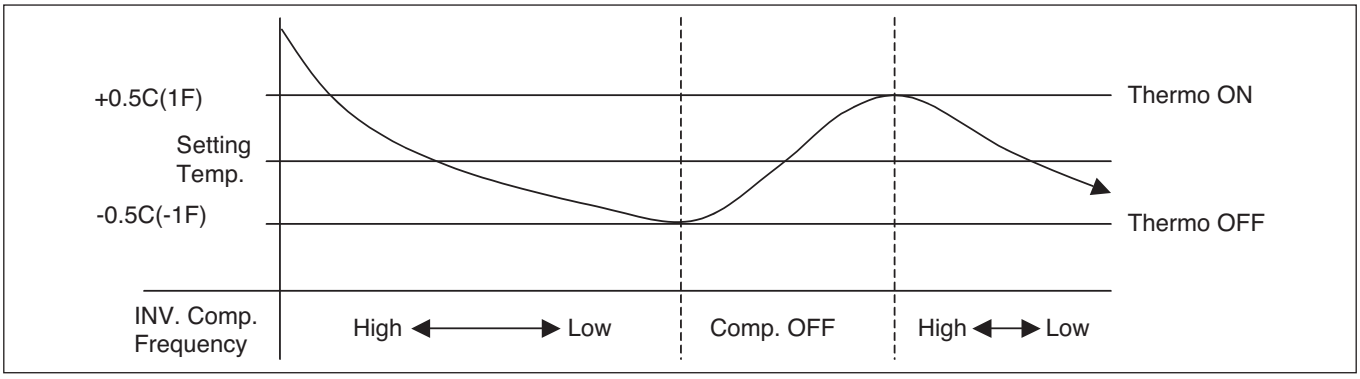
1. List of Functions & Controls

Category	Function	Description	Remark
Basic mode controls	Cooling Mode	Cooling operation	
	Heating Mode	Heating operation	
	Healthy Dehumidification	Dry operation	
	Auto Changeover	Cooling mode is automatically changed to heating mode and vice versa	
Special Mode controls	Jet Cool	Powerful cooling mode	
	Jet Heat	Powerful heating mode	
	Energy saving	Air volume & set temp. are automatically selected for saving energy in cooling mode	
Utility Functions	Forced operation	Operation without remote controller	
	Auto Clean	After cooling operation, this function makes the evaporator dry	
	Air volume control	Indoor Fan speed Control	
	Natural Air control	Air volume control Program	
	Auto Swing	Vertical Airflow Direction control	
	Sleep mode Auto control	Air volume & set temp. are automatically changed for comfortable sleep	
	Auto Restart Function	When power returns after a power failure, Unit restarts in the previous operating mode	

NOTE: The Exploded View SVC Manual has the particular Function table for each model.

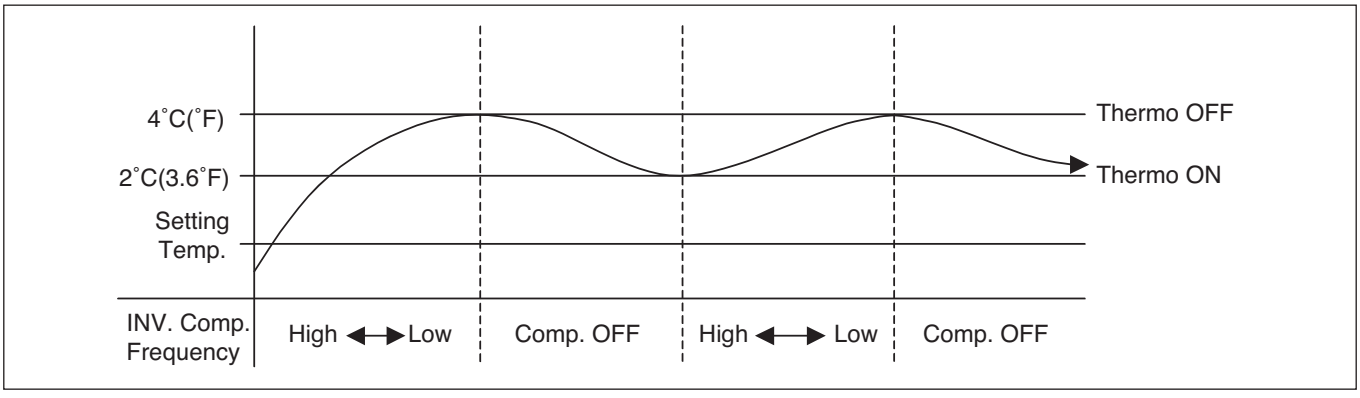
2. Basic Mode Controls

2.1 Cooling Mode



- Operating frequency of compressor depends on the load condition, like the difference between the room temp. and the set temp., frequency restrictions.
- If the compressor operates at some frequency, the operating frequency of compressor cannot be changed within 90 seconds. (not emergency conditions)
- Compressor turned off when
  - Intake air temperature reaches below 0.5°C(1°F) of the setting temperature for three minute continuously.
  - Intake air temperature reaches below 1.5°C(3°F) of the setting temperature
- Compressors 3 minute time delay.
  - After compressor off, the compressor can restart minimum 3 minute later.

2.2 Heating Mode



- Operating frequency of compressor depend on the load condition, The difference between the room temp. and set temp., frequency restrictions.
- If compressor operates at some frequency, the operating frequency of compressor cannot be changed within 90 seconds.
- Condition of compressor turned off
  - When intake air temperature reaches 4°C(°F) above the setting temperature.
- Condition of compressor turned on
  - When intake air temperature reaches below 2°C(3.6°F) of above the setting temperature.

* Condition of indoor fan turned off

- While in defrost control, the indoor and outdoor fans are turned off.
- Compressor 3 minute delay
  - After compressor off, the compressor can restart minimum 3 minute later.

2.3 Healthy Dehumidification operation

• When the dehumidification operation is set by the remote controller, the intake air temperature is detected and the setting temp. is automatically set according to the intake air temperature.

Intake air Temp.	Setting Temp.
26°C(78.8°F) ≤ intake air temp.	25°C(77°F)
24°C(75.2°F) ≤ intake air temp.< 26°C(78.8°F)	intake air temp. -1°C(-2°F)
22°C(71.6°F) ≤ intake air temp. < 24°C(75.2°F)	intake air temp. -0.5°C(-1°F)
18°C(64.4°F) ≤ intake air temp. < 22°C(71.6°F)	intake air temp.
intake air temp. < 18°C(64.4°F)	18°C(64.4°F)

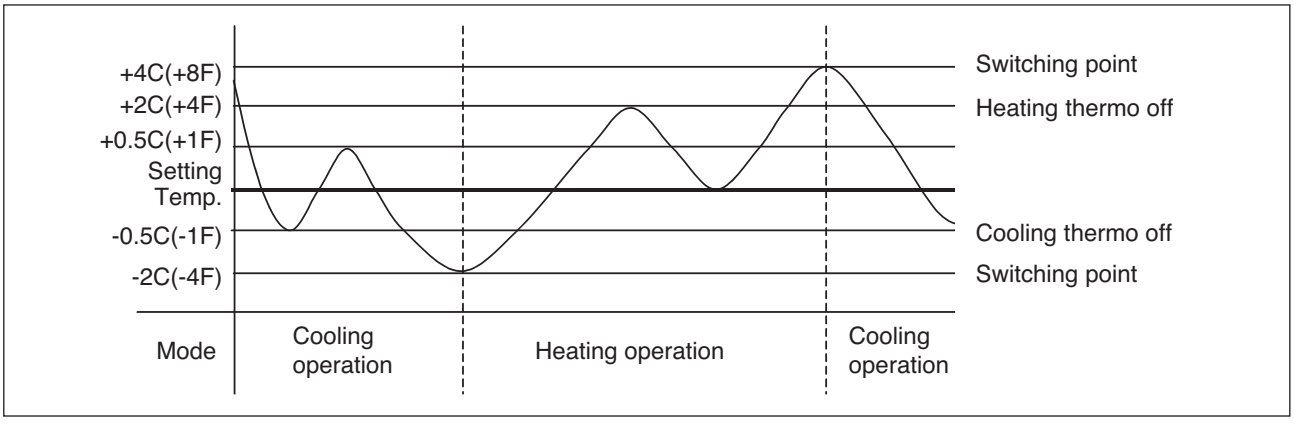
• When intake air temp. is 1˚C(2˚F) above the setting temp., condition of compressor is same as in cooling mode operation.

• When intake air temperature reaches 1˚C(2˚F) below the setting temp., compressor operates in step1~step3 and the indoor fan speed again operates at low speed or comes to a stop.

2.4 Auto changeover operation

• The air conditioner changes the operation mode automatically to keep indoor temperature steady.

• When room temperature vary over ±2°C(±4°F) with respect to setting temperature, air conditioner keeps the room temperature in ±2°C(±4°F) with respect to setting temperature by changing the mode from cooling to heating and vice versa.



3. Special Mode Controls

3.1 Jet Cool operation

- In the heating mode or Auto Changeover operation, the Jet cool function does not work.
  When it is input while in other mode of operation (cooling, dehumidification, Air purification, Air circulation), the Jet cool operation takes place.
- In the Jet cool mode, the indoor fan is operated at super-high speed for 30 min. at cooling mode operation.
- In the Jet cool mode, the room temperature is maintained at a setting temperature of 18°C(64.4°F).
- When the sleep timer mode is input during the Jet cool operation, the Jet cool mode has the priority.
- When the Jet cool button is pressed, the horizontal vane of the unit is reset to those of the initial cooling mode and then operate so that the air outflow could reach further.

3.2 Jet Heat operation

- While in cooling mode or Auto Changeover operation, the Jet Heat function does not work.
  When it is input while in the Heating mode operation (dehumidification), the Jet Heat mode operation takes place
- In the Jet Heat mode, the indoor fan operated at super-high speed for 60 min. at Heating mode operation.
- In the Jet Heat mode, the room temperature is maintained at a temperature of 30°C(86°F).
- When the sleep timer mode is input during the Jet Heat mode operation, the Jet Heat mode has the priority.
- When the Jet Heat button is pressed, the horizontal vane of the unit is the unit reset to those of the initial Jet heating mode and then operates so that the air outflow could reach under flow.

3.3 Energy saving operation in cooling mode

- During cooling and dehumidification mode of operation, the Energy saving button can be input.
- In this operation, before we feel cold the set temperature and air volume is set automatically to save energy.

4. Utility Functions

4.1 Forced operation

• To operate the appliance manually in case when the remote control is lost, the forced operation selection switch is on the main unit of the appliance, and operate the appliance in the standard conditions.

• The operating condition is set according to the outdoor temp. and intake air temperature as follows.

Indoor temp.	Operating Mode	Setting temp.	Setting speed of indoor fan
over 24°C(75.2°F)	Cooling	22°C(71.6°F)	High speed
21~24°C(69.8~75.2°F)	Healthy Dehumidification	23°C(73.4°F)	
below 21°C(69.8°F)	Heating	24°C(75.2°F)	

• Operating procedures when the remote control can't be used is as follows :

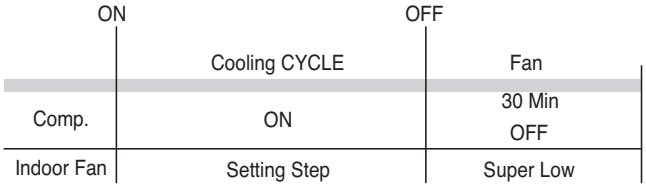
- The operation will be started if the ON/OFF button is pressed.
- If you want to stop operation, re-press the button.
- The ON/OFF switch is on the display PCB or side of indoor unit

4.2 Auto cleaning operation

• Function used to perform Self Cleaning to prevent the Unit from Fungus and bad odor.

• Used after the Cooling Operation before turning the unit off, clean the Evaporator and keep it dry for the next operation.

• The function is easy to operate as it is accessed through the Remote controller.



4.3 Air volume control

- UIndoor fan motor control have 6 steps or 8 steps.
- UAir volume is controlled "SH", "H", "MH", "M", "ML", "L" by the remote controller.
- "SL" step is selected in "Sleep Mode" operation.

Step	Description
SL	Super Low
L	Low
ML	Medium-Low
M	Medium
MH	Medium-High
H	High
SH	Super High
Auto	Natural Wind

4.4 Natural Air Control(Natural Wind)

- When the Auto Step is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec. randomly by the Chaos Simulation.

4.5 Auto Swing

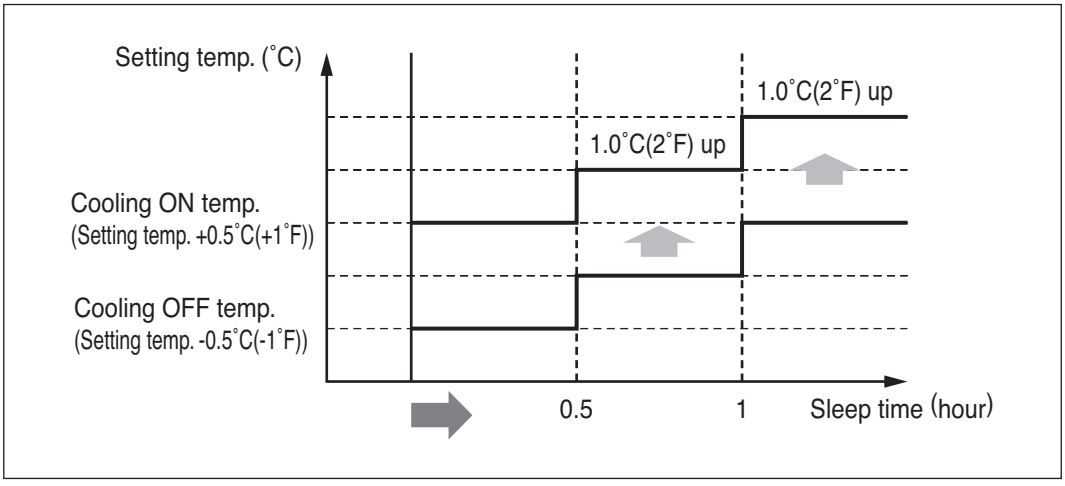
- By the Auto swing key input, the horizontal vane automatically operates with the Auto swing or it is fixed to the desired direction.

4.6 Sleep mode Auto control

- When the set sleep time is reached set time of [1,2,3,4,5,6,7hour] input by the remote control during the operation, the operation of the appliance stops.
- When the appliance is on pause, the sleep timer mode cannot be input.

4.6.1 Sleep timer operation for cooling cycle

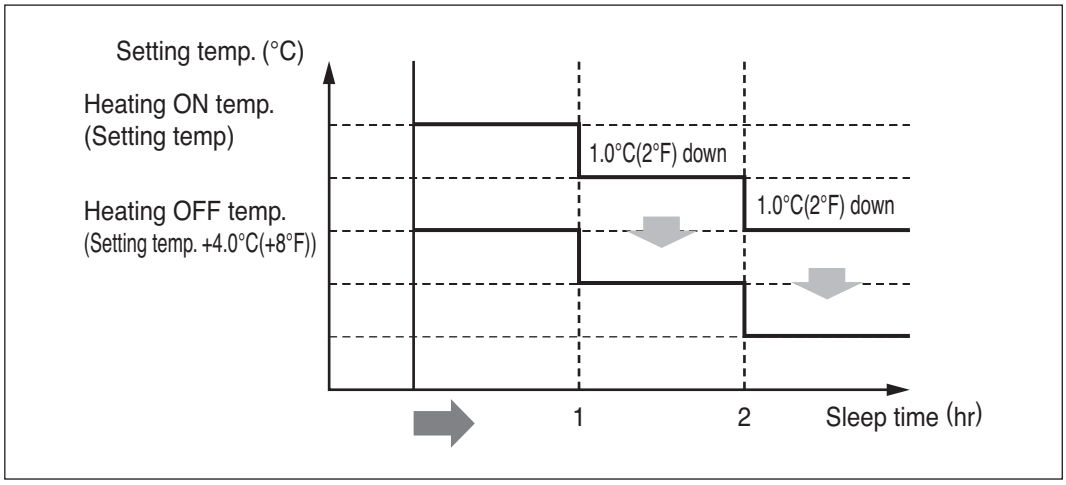
- While in cooling mode , 30 min. after the start of the sleep timer, the setting temperature increases by 1°C(2°F). After another 30minutes lapse, it increases again by 1°C(2°F).



NOTE: Some Models are different by swing width and swing pattern.

4.6.2 Sleep timer operation for heating cycle

• While in heating mode, 60 min. after the start of the sleep timer, the setting temperature decreases by 1°C(2°F). After another 60minutes lapse, it decreases again by 1°C(2°F).



4.7 Auto restart

• When the power comes back after a sudden power failure during operation, the mode before the power failure is kept on the memory of the appliance and it automatically operates in the saved mode on the memory.

• Operation mode that is kept on the memory
- State of operation ON/OFF
- Operation mode/setting temp./selected airflow speed
- Sleep timer mode/remaining time of sleep timer
- Auto Swing

Part 3 Test Run

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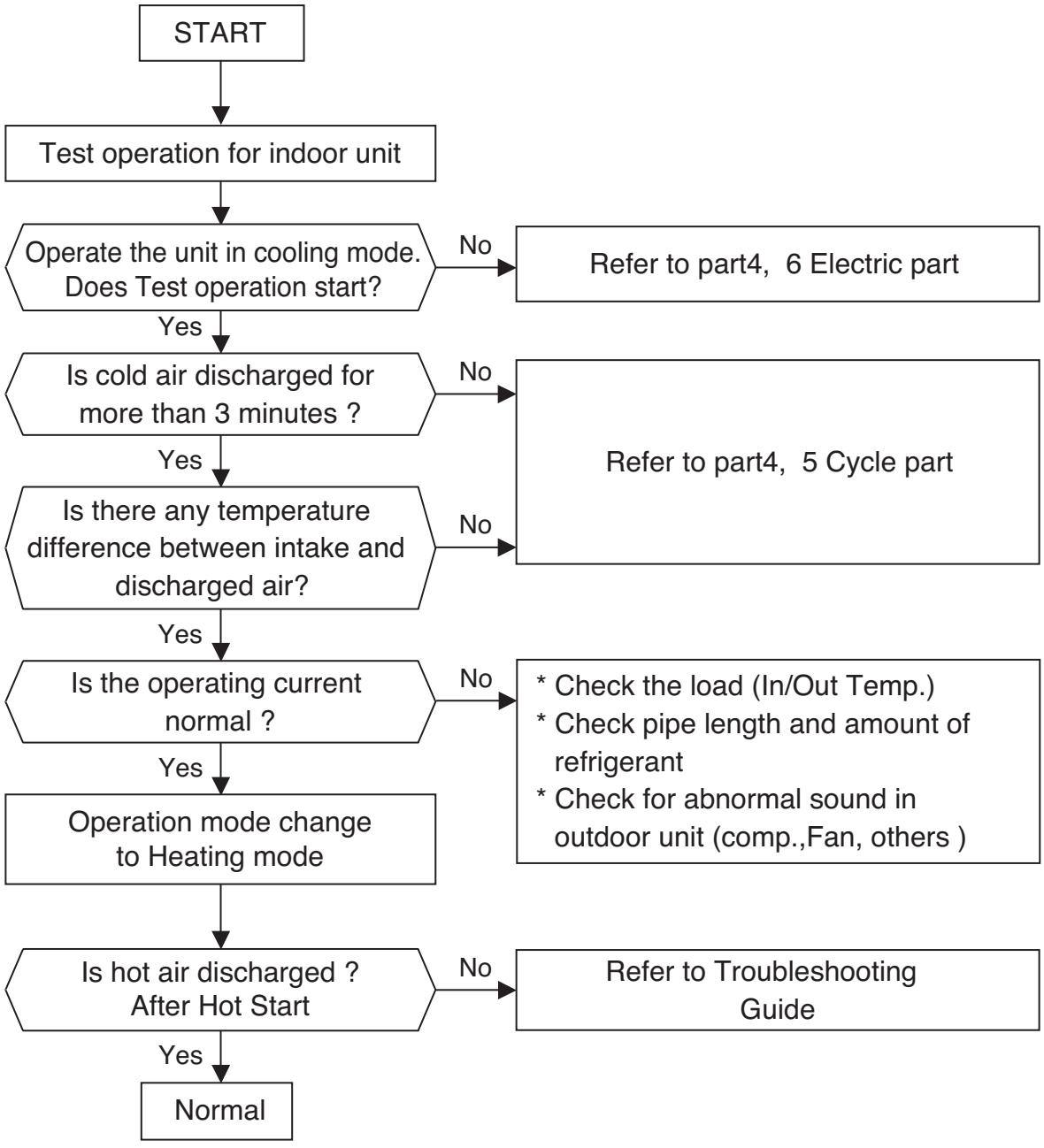
1. Check before Test Run

1	Check to see whether there is any refrigerant leakage, and check whether the power or transmission cable is connected properly. **NOTE**: Check that there should be no disconnection when all pins and wires are pulled by hands.
2	Check whether the liquid pipe and gas pipe valves are fully opened. **NOTE**: Be sure to tighten caps.
3	Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less. **NOTE**: Never carry out mega ohm check over terminal control board. Otherwise the control board may break. Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground maydecrease to approx. 2.0 MΩ as a result of refrigerant accumulation in the internal compressor. If the insulation resistance is less than 2.0 MΩ, turn on the main power supply.

2. Test Run Flow chart


START
Test operation for indoor unit
Operate the unit in cooling mode. Does Test operation start?
No
Refer to part4, 6 Electric part
Yes
Is cold air discharged for more than 3 minutes ?
No
Refer to part4, 5 Cycle part
Yes
Is there any temperature difference between intake and discharged air?
No
Yes
Is the operating current normal ?
No
* Check the load (In/Out Temp.)
* Check pipe length and amount of refrigerant
* Check for abnormal sound in outdoor unit (comp.,Fan, others)
Yes
Operation mode change to Heating mode
Is hot air discharged ? After Hot Start
No
Refer to Troubleshooting Guide
Yes
Normal

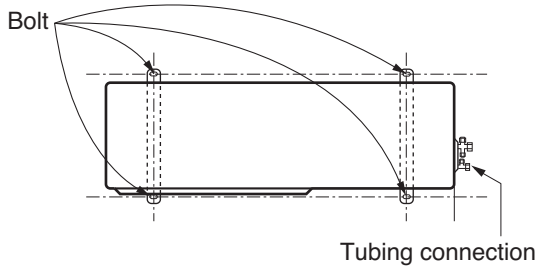
NOTE: When outdoor temperature is low,the unit is operated to Heating mode

3. Test Run Detail

1. Check that all tubing and wiring have been properly connected.
2. Check that the gas and liquid side service valves are fully open.
3. Check that all pins and wires have been connected thoroughly by pulling with hands.

Settlement of outdoor unit

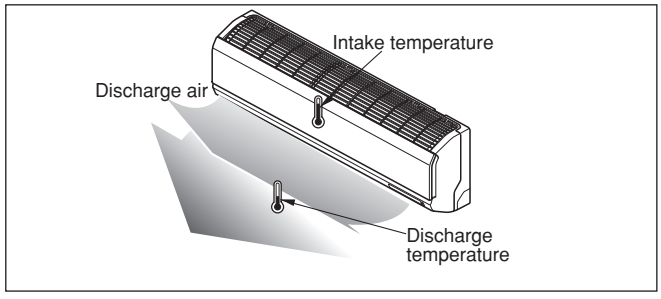
- Anchor the outdoor unit with a bolt and nut(ø10mm) tightly and horizontally on a concrete or rigid mount.
- When installing on the wall, roof or rooftop, anchor the mounting base securely with a nail or wire assuming the influence of wind and earthquake.
- In the case when the vibration of the unit is conveyed to the hose, secure the unit with an anti-vibration bushing.



Evaluation of the performance

Operate unit for 15~20 minutes, then check the system refrigerant charge:

1. Measure the pressure of the gas side service valve.
2. Measure the temperature of the intake and discharge air.
3. Ensure the difference between the intake temperature and the discharge is more than 8°C(46°F) (Cooling) or (Heating).



4. For reference; the gas side pressure of optimum condition is as below.(Cooling)

Refrigerant	Outside ambient TEMP.	The pressure of the gas side service valve.
R22	35°C (95°F)	4~5kg/cm²G(56.8~71.0 P.S.I.G.)
R410A	35°C (95°F)	8.5~9.5kg/cm²G(120~135 P.S.I.G.)

NOTE: If the actual pressure is higher than shown, the system is most likely over-charged, and charge should be removed.
If the actual pressure are lower than shown, the system is most likely undercharged, and charge should be added.

The air conditioner is now ready for use.

PUMP DOWN

This is performed when the unit is to be relocated or the refrigerant circuit is serviced.
Pump Down means collecting all refrigerant in the outdoor unit without loss in refrigerant gas.

CAUTION:
Be sure to perform Pump Down procedure with the unit in cooling mode.

Pump Down Procedure

1. Connect a low-pressure gauge manifold hose to the charge port on the gas side service valve.
2. Open the gas side service valve halfway and purge the air from the manifold hose using the refrigerant gas.
3. Close the liquid side service valve(all the way in).
4. Turn on the unit's operating switch and start the cooling operation.
5. When the low-pressure gauge reading becomes 1 to 0.5kg/cm² G(14.2 to 7.1 P.S.I.G.), fully close the gas side valve stem and then quickly turn off the unit. At that time, Pump Down has been completed and all refrigerant gas will have been collected in the outdoor unit.

5. Check operating current.
6. Change operation mode and check.

Part 4 Trouble Shooting

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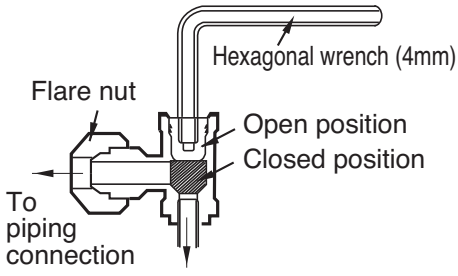
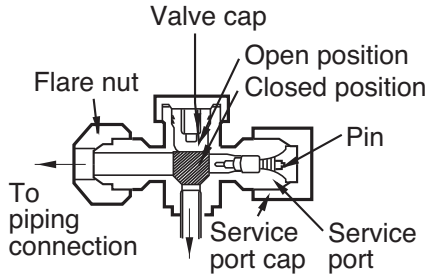
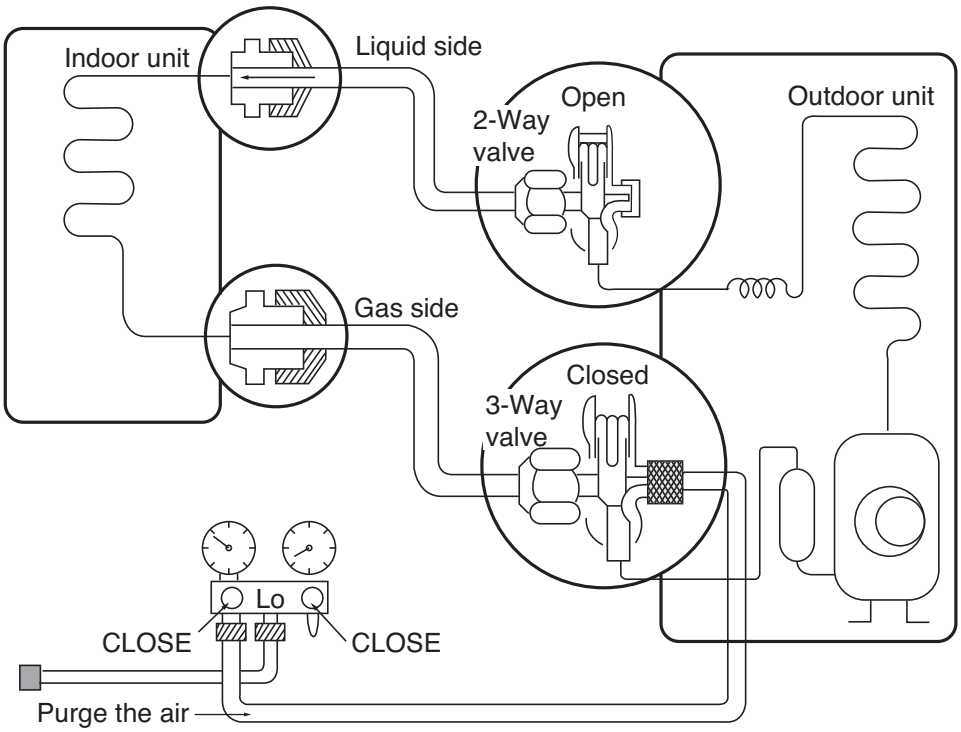
1. 2-Way, 3-Way Valve

		2-way Valve (Liquid Side)	3-way Valve (Gas Side)	
		 To outdoor unit	 To outdoor unit	
	Works	Shift position	Shift position	Service port
	Shipping	Closed (with valve cap)	Closed (with valve cap)	Closed (with cap)
1.	Air purging (Installation)	Open (counter-clockwise)	Closed (clockwise)	Open (push-pin or with vacuum pump)
	Operation	Open (with valve cap)	Open (with valve cap)	Closed (with cap)
2.	Pumping down (Transferring)	Closed (clockwise)	Open (counter-clockwise)	Open (connected manifold gauge)
3.	Evacuation (Servicing)	Open	Open	Open (with charging cylinder)
4.	Gas charging (Servicing)	Open	Open	Open (with charging cylinder)
5.	Pressure check (Servicing)	Open	Open	Open (with charging cylinder)
6.	Gas releasing (Servicing)	Open	Open	Open (with charging cylinder)

2. Pumping Down



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the open position.
- – Remove the valve stem caps and confirm that the valve stems are in the raised position.
- – Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
- – Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.
- – Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

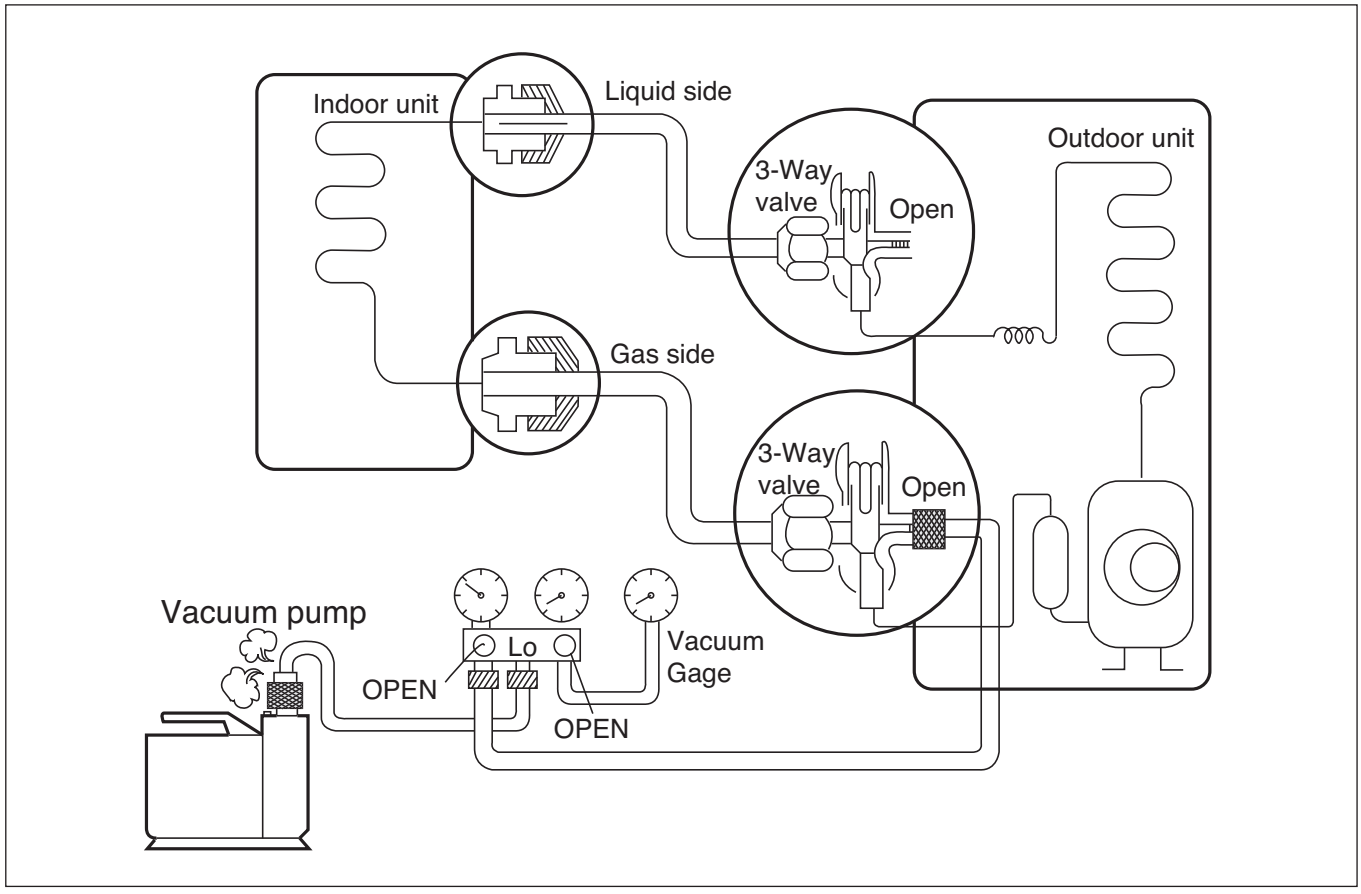
(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 1kg/cm^2·g.

(7) Immediately set the 3-way valve to the closed position.
- – Do this quickly so that the gauge ends up indicating 3 to 5kg/cm^2·g.

(8) Disconnect the charge set, and mount the 2-way and 3-way valve's stem nuts and the service port nut.
- – Use torque wrench to tighten the service port nut to a torque of 1.8 kg·m.
- – Be sure to check for gas leakage.

3. Evacuation (All amount of refrigerant leaked)



• Procedure

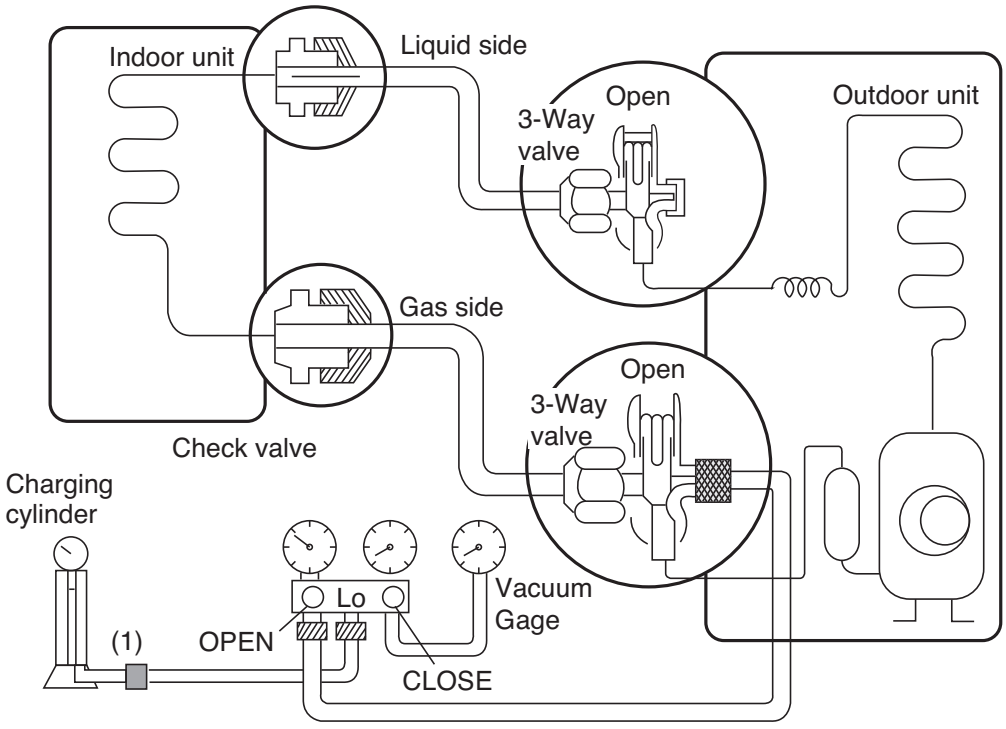
(1) Connect the vacuum pump to the center hose of charge set center hose

(2) Evacuation for approximately one hour.
– Confirm that the gauge needle has moved toward 0.8 Torr.

(3) Close the valve (Lo side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

(4) Disconnect the charge hose from the vacuum pump.
– Vacuum pump oil.
If the vacuum pump oil becomes dirty or depleted, replenish as needed.

4. Gas Charging (After Evacuation)



• Procedure

(1) Connect the charge hose to the charging cylinder.
- – Connect the charge hose which you dis-connected from the vacuum pump to the valve at the bottom of the cylinder.
- – If you are using a gas cylinder, also use a scale and reverse the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.
- – Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant). The procedure is the same if using a gas cylinder.

(3) Open the valve (Lo side on the charge set and charge the system with liquid refrigerant.
- – If the system can not be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure (pumping down-pin).

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with larger amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.
- – Stopping partway will allow the gas to be discharged.
- – If the system has been charged with liquid refrigerant while operating the air conditioner turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem nuts and the service port nut.
- – Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.
- – Be sure to check for gas leakage.

5. Cycle Troubleshooting Guide

Problem	Possible causes	Corrective action	Error Code
Abnormal operating conditions.	• There is a burning smell and a strange sound coming from the unit.	• Turn off the air conditioner, unplug the power cord and contact the service center.	
	• Water leaks from the indoor unit even when the humidity level is low.		
	• The power cord is damaged or generating excessive heat.		
	• A switch, a circuit breaker (safety, ground) or a fuse is not operated properly.		
The air conditioner does not work.	• The air conditioner is unplugged.	• Check whether the power cord is plugged into the outlet.	
	• A fuse is blown or the power supply is blocked.	• Replace the fuse or check if the circuit breaker has tripped.	27
	• A power failure has occurred.	• Turn off the air conditioner when a power failure occurs. • When the power is restored, wait 3 minutes, and then turn on the air conditioner.	23
	• The voltage is too high or too low.	• Check if the circuit breaker has tripped.	23, 40
	• The air conditioner turned off automatically at a preset time.	• Press the power button again.	10
	• Battery setting is wrong in the remote controller.	• Is the battery inserted in Remote controller? Is the battery inserted with the correct terminal (+)(-)? • Even if you check the upper lists, the air-conditioner does not operate. Please replace new batteries.	
The air conditioner does not work.	• The type of the indoor units is not compatible with that of the outdoor unit.	• Replace the outdoor unit to suitable one.	05, 53
	• The outdoor air temperature is unsuitable for operating the air conditioner.	• Heating operation can be used when the outdoor air temperature is under 18°C, and cooling operation can be used when the outdoor air temperature is over -10°C.	

Problem	Possible causes	Corrective action	Error Code
The air conditioner does not generate cool air.	• Air is not circulatingproperly.	• Make sure that there are no curtains, blinds or furniture blocking the front of the air conditioner.	
	• The air filter is dirty.	• Clean the air filter once every 2 weeks. • See “Cleaning Air Filter” for more information.	
	• The room temperature is too high.	• In summer, it may take some time to cool indoor air. • In this case, select the jet cool operation to cool indoor air quickly.	01, 05, 09
	• Cold air is escaping from the room.	• Make sure that no cold air is escaping through ventilation points in the room.	
	• The desired temperature is higher than the set temperature.	• Set the desired temperature to a level lower than the current temperature.	01
	• There is a heating source nearby.	• Avoid using a heat generator such as an electric oven or a gas burner while the air conditioner is in operation.	
	• Air circulation operation is selected.	• In the air circulation operation, air blows from the air conditioner without cooling or heating the indoor air. • Switch the operation mode to the cooling operation.	
	• Outside temperature is too high.	• The cooling effect may not be sufficient.	01, 26, 32, 61, 62
The air conditioner does not generate warm air.	• When the heating mode is started. • Vane is almost closed and air flow does not come out. • Even though outdoor unit is already begun to operate.	• This symptom is normal. • Please wait until the unit is preparing warm air. • This function prepare to blow warm air.	
	• Defrosting mode is being done in the outdoor unit.	• In heating mode, ice/frost is built up on the coils when the outside temperature fall down. • This function remove a layer of frost on the coil. • Please wait until this operation is completed. It takes about 15 mins.	
	• Outside temperature is too low.	• The heating effect may not be sufficient.	01, 26, 32, 61, 62
The air-conditioner stops during operation.	• The air conditioner is suddenly turn off.	• The timer function could be operated. If the timer function would operate, the air-conditioner can be turn off. • Check the timer setting is correct.	41, 44, 45, 65
	• A power failure has occurred during operation.	• There is the Auto Restart Function. It is a default setting. • This function can turn on the unit automatically when the power is restored. • If you live in frequent power failure area, this function would be useful.	41, 44, 45, 65

Problem	Possible causes	Corrective action	Error Code
The air conditioner stops during operation.	• The connection of the indoor and outdoor units has a problem.	• Conduct the wiring and piping error check.	05, 09, 53
	• The thermistor recognition has a defect.	• Check that the thermistor have been separated from the pipe holder.	09, 32, 41, 45
	• The electronic expansion valve operates incompletely.	• Check the temperature of the connection pipe.	44, 61, 65
Indoor unit is still operating even when the power is being turned off.	• Auto-Clean mode is being operated. • This function is to remove the rest of moisture indoor unit.	• Please, wait until the end of functions. • It will be inhibit a fungal growth. If you do not want this feature, you can turn off to press.	67
Mist is discharged from the air outlet of the indoor unit.	• The cooled air from the air conditioner makes mist.	• When the room temperature is down, this phenomenon will disappear.	01, 02, 06, 12
Water leaks from the outdoor unit.	• In the heating operations, condensed water drop from the heat exchanger.	• This symptom need to install drain hose under the base pan. • Contact the installer.	
Operating noise or vibration.	• Clicking sound Clicking sound can be heard either when the unit starts or stops due to movement of reversing valve. • Creaking sound The plastic parts of the indoor unit make sound of shrinks and expands due to a sudden temperature change. • The water flowing sound, Blowing sound The flow of refrigerant through the air conditioner is switching, noise can be heard.	• These are normal symptoms. • After a moment, it will be silent.	41, 45, 62
Operating noise or vibration.	• The installation condition is in trouble.	• Adjust the position of the air conditioner so that it can have enough space.	10, 26, 67
The indoor unit gives out odor.	• The air smells bad because a musty or cigarettes odor may be absorbed into the indoor unit and discharged with airflow.	• If the smell does not disappear, you need to wash filter or heat exchanger. • Contact the installer.	

NOTICE

Temperature difference between intake and discharge air depends on room air humidity. When the room air humidity is relatively higher, temperature difference is smaller. When the room air humidity is relatively lower temperature difference is larger.

6. Electronic Parts Troubleshooting Guide

Trouble 1 The Product doesn't operate at all. (9~30kBtu/h Model)

Turn off the main power and wait until LED on outdoor PCB is off.

↓

Turn on the main power again.

↓

Does "Beeping" sound is made from the indoor unit?
Does "Lighting" LED is mounted on the outdoor PCB?

NO

Check the voltage of power(AC 208~230V, 60Hz).

- The voltage of main power.
- The voltage applied to the unit.
- The connecting method of Indoor/Outdoor connecting cable (each color)
- The P.W.B. Ass'y
  (Fuse,Noise Filter, Power Module(SMPS), IC01D,IC04D)
- Connection between housing and harness.
- All the harnesses should be checked by pulling with hands directly.
- No harness should be divided from the housing.

YES

- Primarily, the operating condition of Micom is O.K.

↓

- Check CN-DISP1

The operation check of the P.C.B. Ass'y

Procedure	Specification	Remedy
1) The input voltage of Power Module(SMPS)	: DC 220V~390V	Replace the P.C.B.
2) The output voltage of Power Module (SMPS)	: 15V ±10%	
3) IC01D(LD1085), IC04D(7805)	: DC 5V	

Trouble 2 Product doesn't operate with the remote controller.

Turn on main power.

While the compressor has been stopped, the compressor does not operate owing to the delaying function for 2 minutes after stopped.

When the compressor stopped Indoor Fan is driven by a low speed.
At this point the wind speed is not controlled by the remote controller.
(When operated in the Sleeping Mode, the wind speed is set to the low speed as force).)

Caused by the remote controller.

When the mark ( ) is displayed in LCD screen, replace battery.

Caused by other parts except the remote controller

Check the contact of CN-DISP 1, 2 connector

Check DISP P.C.B Ass'y
-Voltage between CN-DISP1 ③ - ⑧ : DC +5V

Check point
- Check the connecting circuit between MICOM PIN and CN-DISP1 PIN ⑦
- Check receiver ass'y

Trouble 3 The Compressor/Outdoor Fan don't operate

Turn on the main power.

↓

Operate Cooling Mode by setting the desired temperature of the remote controller is less than one of the Indoor temperature by 1°C at least.

↓

When in air circulation mode, compressor/outdoor fan is stopped.

↓

Check the sensor for Indoor temperature is attached as close as to be effected by the temperature of Heat Exchange (EVA.)

↓

When displaying Error code, refer to the trouble shooting guide.

↓

Check the main power source.(AC 208V~230V)

Check the trouble shooting guide error code 21,26.

Check that CN_FAN(A,B) supplied voltage to outdoor PCB is about AC 208V~230V.

Check that whether the housings and harnesses would be separated when there are attempts to disconnect those.

Check to pull with hands directly to the harness.

No harness should be divided from the housing.

↓

Turn off main power.

↓

Check the electrical wiring diagram of Outdoor side.
Check the open or short of connecting wires between Indoor and Outdoor.

Trouble 4 When indoor Fan does not operate

Turn off main power.

⇩

Check the connection of CN-FAN.

⇩

Check the Fan Motor.

⇩

Check the Fuse(AC250V, T2A).

⇩

Check the related circuit of indoor Fan Motor.

- The pin No. ㊳ of micom and the part for driving SSR.(Q01M)
- Check the related pattern.
- Check the SSR.
  - SSR Open: Indoor Fan Motor never operate.
  - SSR short: Indoor Fan Motor always operates in case of ON or OFF.
- Check the connectors.
- Check that whether the housings and harnesses would be separated when there are attempts to disconnect those.
- Check to pull with hands directly to the harness.
- No harness should be divided from the housing.

⇩

Turn on the main power

⇩

Check the SSR high speed operation by remote control.
(the Indoor Fan Motor is connected)

The voltage of Pin No 1(orange) and 3(black) of CN-FAN.

⇩

About AC 160V over	About AC 50V over
⇩	⇩
SSR is not damaged	Check SSR

7. Self-diagnosis Function

■ Error Indicator

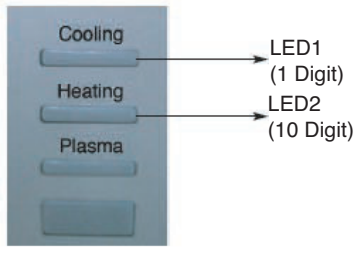
- The function is to self-diagnosis airconditioner and express the troubles identically if there is any trouble.
- If more than two troubles occur simultaneously, primarily the highest trouble of error code is expressed.
- After error occurrence, if error is released, error LED is also released simultaneously.
- To operate again on the occurrence of error code, be sure to turn off the power and then turn on.
- Having or not of error code is different from Model.

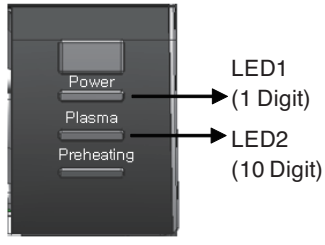
■ Indoor Unit Error

1. SW, SB, SC, SH, S4, S5 Chassis

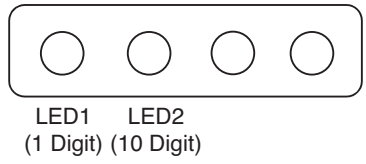
Error code	Description	Error indication	
		Indoor unit	
		LED1	LED2
1	Indoor Sensor (Air) open/short	1 Time	-
2	Indoor Sensor (Entry Pipe) open/short	2 Times	-
4	Float Switch Error	4 Times	-
5	Communication Failure (Indoor Unit ↔ Outdoor Unit)	5 Times	-
6	Indoor Sensor (Exit Pipe) open/short	6 Times	-
9	EEPROM ERROR (Indoor Unit)	9 Times	-
10	Indoor Unit Fan Lock (Operation Failure)	-	1 Time
12	Indoor Sensor (Middle Pipe) open/short	2 Times	1 Time

1) SW, SB, SC, Chassis





2) S4, S5 Chassis (4 LED Model)



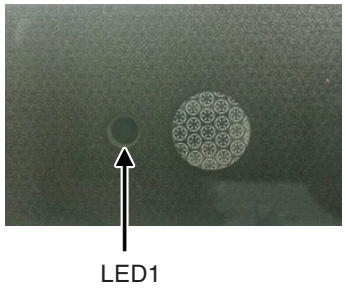
3) SH Chassis

2. SE Mirror, S8, SD, SM, SN Chassis

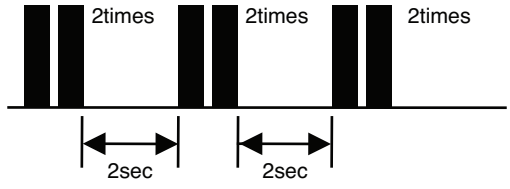
Ex) Error Code 5 (Communication Failure)

3. SF Chassis (1 LED Model)

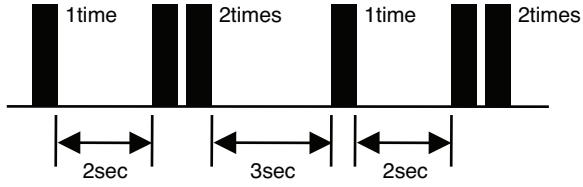
Error code	Description
1	Indoor Sensor (Air) open/short
2	Indoor Sensor (Entry Pipe) open/short
4	Float Switch Error
5	Communication Failure (Indoor Unit ↔ Outdoor Unit)
6	Indoor Sensor (Exit Pipe) open/short
9	EEPROM ERROR (Indoor Unit)
10	Indoor Unit Fan Lock (Operation Failure)
12	Indoor Sensor (Middle Pipe) open/short



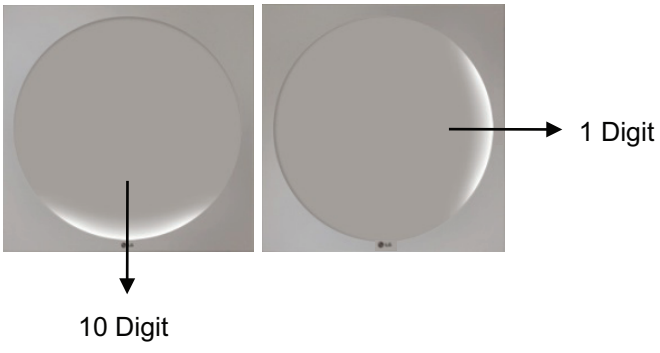
Ex) Error Code 2 : Indoor Sensor(Entry Pipe) open/shot)



Ex) Error Code 12 : Indoor Sensor(Middle Pipe) open/short

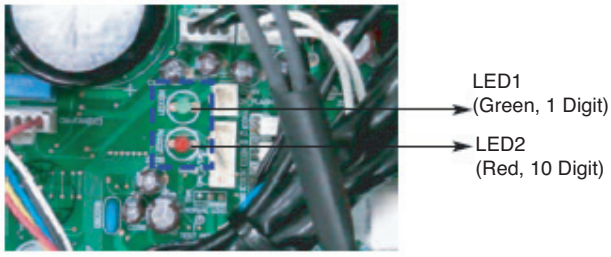


4. S3 Chassis (Lighting Model)



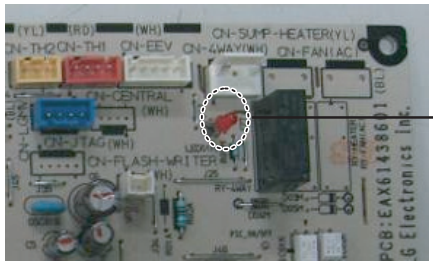
■ Outdoor Unit Error

1) 2 LED Type

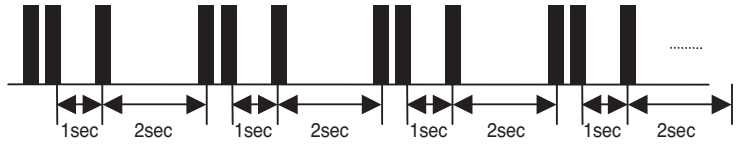


Error Code	Description	Error Indication			
		Indoor Unit		Outdoor Unit	
		LED2	LED1	Red	Green
21	DC Peak (IPM Fault)	2 Times	1 Time	2 Times	1 Time
22	CT 2(Max CT)	2 Times	2 Times	2 Times	2 Times
23	DC Link Low Volt	2 Times	3 Times	2 Times	3 Times
25	Low wire volt/ high wire volt	2 Times	5 Times	2 Times	5 Times
26	DC Comp Position Error	2 Times	6 Times	2 Times	6 Times
27	PSC Fault Error	2 Times	7 Times	2 Times	7 Times
29	Inverter Compressor over-current	2 Times	9 Times	2 Times	9 Times
31	CT error (low current)	3 Times	1 Time	3 Times	1 Time
32	D-Pipe High (INV)	3 Times	2 Times	3 Times	2 Times
37	Failure Compression Ratio	3 Times	7 Times	3 Times	7 Times
40	CT Sensor (Open / Short)	4 Times	-	4 Times	-
41	INV. D-Pipe Th Error (Open / Short)	4 Times	1 Time	4 Times	1 Time
44	Outdoor Air Th Error (Open / Short)	4 Times	4 Times	4 Times	4 Times
45	Cond. Middle Pipe Error (Open / Short)	4 Times	5 Times	4 Times	5 Times
48	Cond. Out Pipe Error (Open / Short)	4 Times	8 Tiems	4 Times	8 Tiems
53	Communication Failure(Outdoor Unit ↔ Indoor Unit)	5 Times	3 Times	5 Times	3 Times
60	EEPROM Check Sum Error	6 Times	-	6 Times	-
61	Cond. Pipe High	6 Times	1 Time	6 Times	1 Time
62	Heatsink High	6 Times	2 Times	6 Times	2 Times
63	Cond. Pipe Low	6 Times	3 Times	6 Times	3 Times
65	Heatsink Th Error (Open/Short)	6 Times	5 Times	6 Times	5 Times
67	Outdoor BLDC Fan Lock	6 Times	7 Times	6 Times	7 Times
72	Failure 4Way	7 Times	2 Times	7 Times	2 Times
73	IGBT Damage	7 Times	3 Times	7 Times	3 Times

2) 1 LED Type



Ex) Error Code 21 (DC Peak)

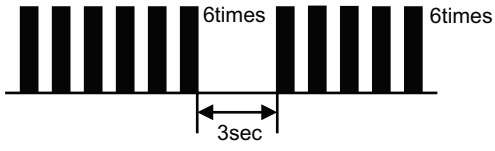


Error Code	Description	Error Indication			
		Indoor Unit		Outdoor Unit	
		LED2	LED1	Red	Red
21	DC Peak (IPM Fault)	2 Times	1 Time	2 Times	1 Time
22	CT 2(Max CT)	2 Times	2 Times	2 Times	2 Times
23	DC Link Low Volt	2 Times	3 Times	2 Times	3 Times
25	Low wire volt/ high wire volt	2 Times	5 Times	2 Times	5 Times
26	DC Comp Position Error	2 Times	6 Times	2 Times	6 Times
27	PSC Fault Error	2 Times	7 Times	2 Times	7 Times
29	Inverter Compressor over-current	2 Times	9 Times	2 Times	9 Times
31	CT error (low current)	3 Times	1 Time	3 Times	1 Time
32	D-Pipe High (INV)	3 Times	2 Times	3 Times	2 Times
37	Failure Compression Ratio	3 Times	7 Times	3 Times	7 Times
40	CT Sensor (Open / Short)	4 Times	-	4 Times	-
41	INV. D-Pipe Th Error (Open / Short)	4 Times	1 Time	4 Times	1 Time
44	Outdoor Air Th Error (Open / Short)	4 Times	4 Times	4 Times	4 Times
45	Cond. Middle Pipe Error (Open / Short)	4 Times	5 Times	4 Times	5 Times
48	Cond. Out Pipe Error (Open / Short)	4 Times	8 Tiems	4 Times	8 Tiems
53	Communication Failure(Outdoor Unit ↔ Indoor Unit)	5 Times	3 Times	5 Times	3 Times
60	EEPROM Check Sum Error	6 Times	-	6 Times	-
61	Cond. Pipe High	6 Times	1 Time	6 Times	1 Time
62	Heatsink High	6 Times	2 Times	6 Times	2 Times
63	Cond. Pipe Low	6 Times	3 Times	6 Times	3 Times
65	Heatsink Th Error (Open/Short)	6 Times	5 Times	6 Times	5 Times
67	Outdoor BLDC Fan Lock	6 Times	7 Times	6 Times	7 Times
72	Failure 4Way	7 Times	2 Times	7 Times	2 Times
73	IGBT Damage	7 Times	3 Times	7 Times	3 Times

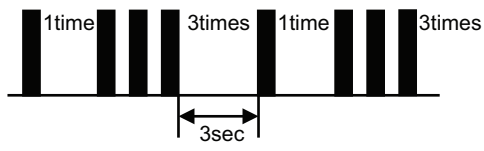
■ Old Model Error

Error Code	Description	Error Indication		Indoor Operation
		Indoor	Outdoor	
1	Indoor Temperature Sensor Error - Suction Sensor open/short - Indoor Pipe Sensor open/short	●	-	Operation
2	Outdoor Temperature Sensor Error - Suction Sensor open/short - Outdoor Pipe Sensor open/short	●	●	Operation
3	Humidity Temperature Sensor Error - Humidity Sensor short	●	●	Operation
4	Heat Sink Temperature Sensor Error - Temperature Sensor open/short - Compressor-off Temperature ≤ Heat Sink Temperature	●	●	Operation
5	Poor Communication(Indoor <-> Outdoor Unit) - The communication is stopped for more than 2 minutes.	●	●	Stop
6	DC Peak Error - DC Peak occurred	●	●	Shutdown
7	CT Error - CT detected	●	●	Shutdown
8	Indoor Unit Fan Lock Error - Fan Lock occurred (BLDC Motor)	●	-	Stop
9	Outdoor Unit Fan Lock Error - Fan Lock occurred(BLDC Motor)	●	●	Stop
10	Compressor Dome Temperature Error - Discharge Pipe Sensor open/short - Compressor-off Temperature ≤ Discharge Pipe Temperature	●	●	Operation
12	EEPROM Error - EEPROM Check sum Error	-	●	Operation
13	PSC Error - PSC Fault Error	-	●	Operation
14	Compressor Phase Current Error - Phase over-current occurred	-	●	Operation

Ex) Error Code 6 : DC Peak Error



Ex) Error Code 13 : PSC Error

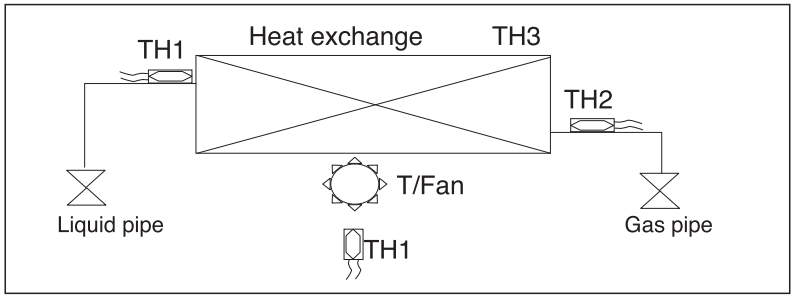


■ Troubleshooting Guide (Indoor Unit)

Inspection Number	Description of Inspection	Cause of Error	Check Point
CH01	Indoor Temperature Sensor	Sensor short/open	Check Sensor connection status and Check Sensor Resistance
CH02	Indoor pipe entry temperature sensor	Sensor short/open	Check Sensor connection status and Check Sensor Resistance
CH06	Indoor pipe exit temperature sensor	Sensor short/open	Check Sensor connection status and Check Sensor Resistance
CH12	Indoor pipe middle temperature sensor	Sensor short/open	Check Sensor connection status and Check Sensor Resistance

1. Check if the temperature connection part is securely connected.
2. After disconnecting from Temperature Sensor PCB Assembly, measure each sensor's resistance.

• Location of the sensor



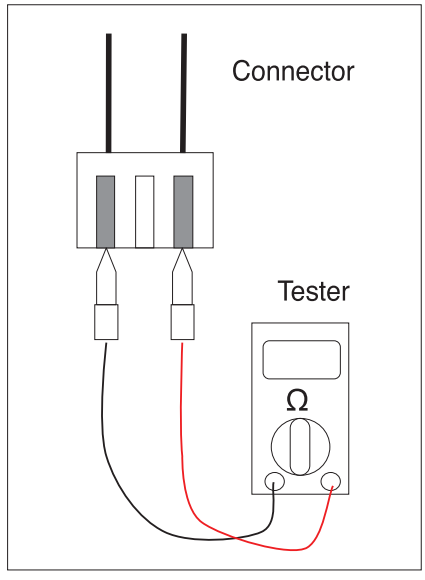
• Air Conditioner Operation Standard

Symbol	Color of the Connector	Title	Resistance	Remark
TH1	White (CN-TH1)	Indoor Temperature Sensor	10 KΩ	25°C Basis
		Pipe entrance Temperature Sensor	5KΩ	
TH2	Red (CN-TH2)	Middle Pipe Temperature Sensor	5KΩ	
TH3	White (CN-TH3)	Pipe Exit Temperature Sensor	5KΩ	

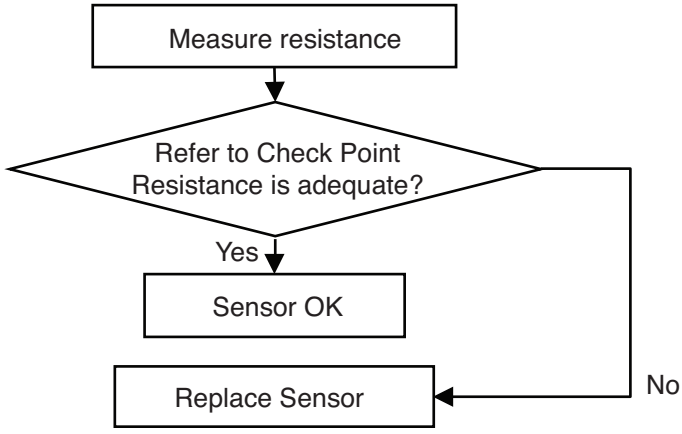
3. If the measurement indicates infinite or 0 Ω please replace temperature sensor.
4. If the measurement is normal, then please check main indoor PCB and replace.

Method of Measurement

1. Disconnect Temperature Sensor connector from the board.
2. Place the range of the tester at Ω.
3. Measure the connector resistance.



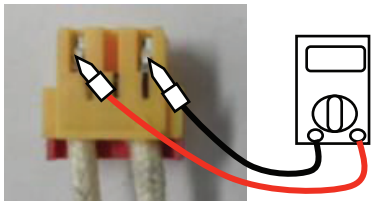
Check Method

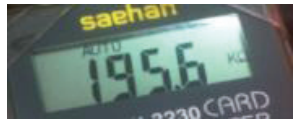


Check Point

1. 10k Ω / at 25°C(77°F)±10%
2. 5k Ω / at 25°C(77°F)±10%
3. 200k Ω / at 25°C(77°F)±10%

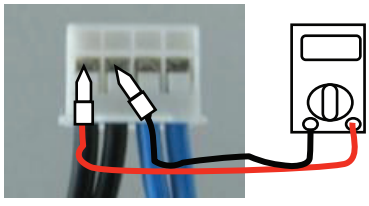
❑ Discharge Pipe Temp Sensor (200kΩ)

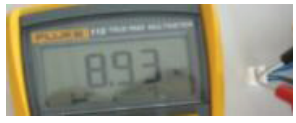




Resistance (White)
200~165kΩ@25~30°C

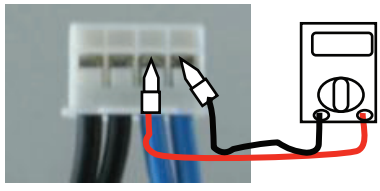
❑ Air/Room Temp. Sensor (10kΩ)





Resistance (Black)
10~8kΩ@25~30°C

❑ Indoor Pipe Temp. Sensor (5kΩ)



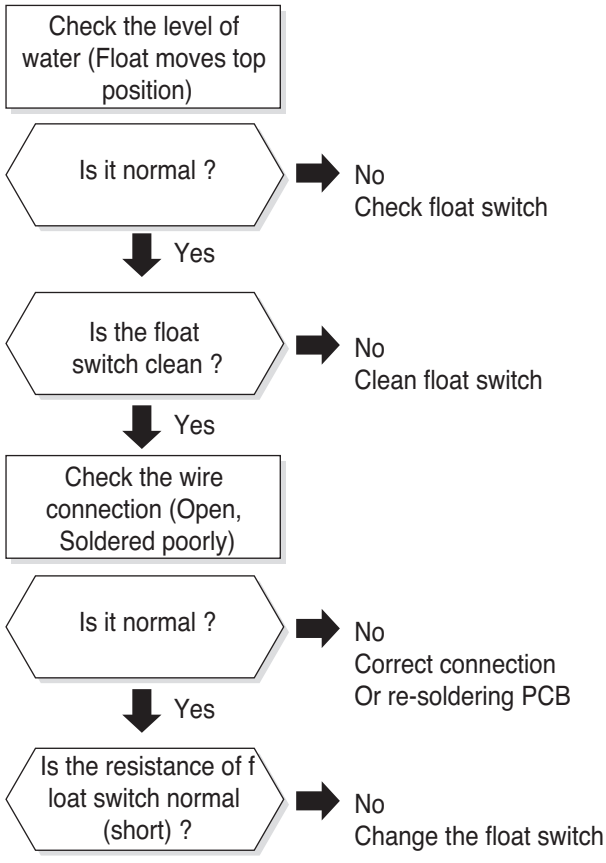
Resistance (Blue)
5~4kΩ@25~30°C

❉ For more information, please refer to the 38 page table.

Resistance - Temp. Sensor Table			
Temp (°C/°F)	Resistance(KΩ)		
	Air Sensor	s-Pipe Sensor	D-Pipe Sensor
-30/-22	204.35	102.17	-
-25/-13	146.97	73.49	-
-20/-4	107.09	53.55	-
-15/5	79	3950	-
-10/14	58.95	29.48	-
-5/23	44.47	22.24	-
0/32	33.9	16.95	585.66
5/41	26.09	13.05	465.17
10/50	20.27	10.14	372.49
15/59	15.89	7.94	300.58
20/68	12.55	6.28	244.33
25/77	10	5	200
30/86	8.03	4.01	164.79
35/95	6.49	3.24	136.64
40/104	5.28	2.64	113.98
45/113	4.32	2.16	95.62
50/122	3.56	1.78	80.65
55/131	2.95	1.48	68.38
60/140	2.46	1.23	58.27
65/149	2.06	1.03	49.88
70/158	1.74	0.87	42.9
75/167	1.47	0.74	37.05
80/176	1.25	0.63	32.14
90/194	0.92	0.46	24.46
100/212	0.68	0.34	18.89

Inspection Number	Description of Inspection	Cause of Error	Check Point
CH04	Float switch	• Float switch open. (Normal : short) • Water over flow	• The connection of wire (Float switch) • Indoor unit installation. (Inclination)

Check Flow Chart



Check Point

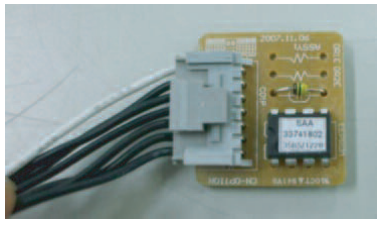
1. Check the wire connection. (Open, Soldered poorly) → Repair the connection or change the PCB.
2. Check the resistance of float switch (Abnormal : Open, Normal : short) → Check the float switch.
3. Check the level of water.

Inspection Number	Description of Inspection	Cause of Error	Check Point
CH05	Poor Communication (Indoor <-> Outdoor unit)	The communication between indoor <-> outdoor unit is stopped for more than 3 minutes.	• AC 220V power input(indoor, outdoor unit) • Disconnection of the transmission connection • Poor connection of connecting wires • Communication line short in GND • No power to outdoor unit PCB(burned) / faulty communication circuit • faulty outdoor unit PCB communication circuit • GND 1, 2 not connected to the main power GND

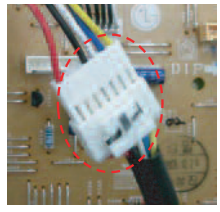
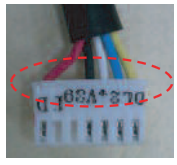
1. Check input power AC 220V (indoor, outdoor unit)
2. Check proper connection of the communication line => check the status of the connection wire fault and connector connections. (verify with hands)
3. Check the resistance between the communication line and GND (normal : 2kΩ or more)
4. Check if the communication connections are properly connected.
5. Check indoor unit GND, outdoor unit GND, and main GND connections.
6. If the length of the communication line exceeds 50M, separate the communication lines.
7. Check for the products or power lines near the communication line that may cause noise.

Inspection Number	Description of Inspection	Cause of Error	Check Point
CH09	CN-OPTION PCB	Poor connection of OPTION PCB	Check the connection status of the OPTION PCB (verify with hands)

1. Check if the OPTION PCB is properly connected.



Inspection Number	Description of Inspection	Cause of Error	Check Point
CH10	Fan Locking (faulty Motor operation)	If the Fan motor does not operate after 1 minute of initial operation	• Structural locking of Fan • Poor connection of the motor connector • Faulty motor • Faulty indoor unit PCB Assembly

	Type of Fault (check procedure)	Cause of Error	Verification	Remedies
Inspection Number CH10	1. Fan structurally Locking ⇩	·Fan is locked by the interference of other structures	• Turn the fan by hand and checking locking materials	• Release lock by reassembling, etc
	2. Poor connection of motor connector ⇩	1) motor connector displaced 	• Verify with hands certainly (pulling by hand to check connection status)	• Connect certainly
		2) Housing terminal displaced 	• Verify with hands certainly (pulling by hand to check connection status)	• Repair or replace the harness.
		3) Pin and wire disconnection or pressed	• Verify with hands certainly (pulling by hand to check connection status)	• Repair or replace the harness.
	3. Faulty motor ⇩	-	-	• Replace motor
	4. Faulty indoor unit PCB	• Motor inner PCB etc. burned		• Replace indoor unit PCB

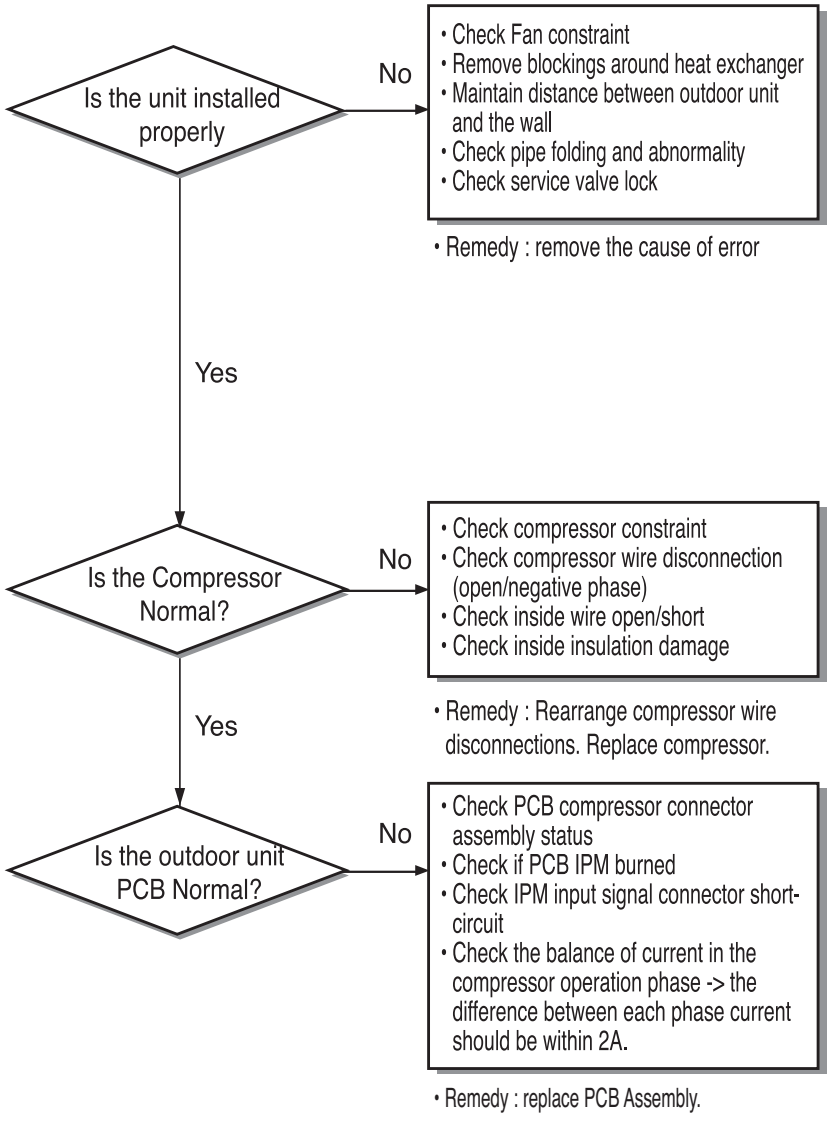
■ Trouble Shooting Guide [Outdoor Unit (2 LED Type)]

1) CH21: DC Peak Error

Inspection Number	Error Detection	Cause of Error	Check Point
CH21	High current into the compressor	• Compressor blocked • Disconnection/short-circuit inside compressor • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check compressor constraint • Check compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IPM burned

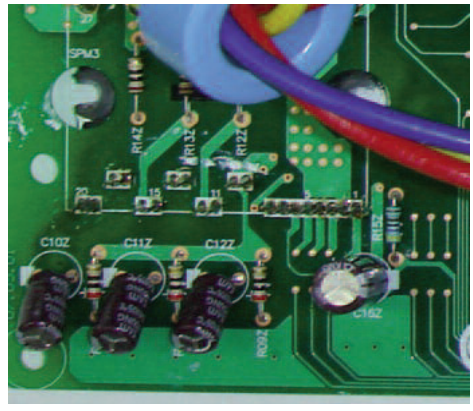
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.

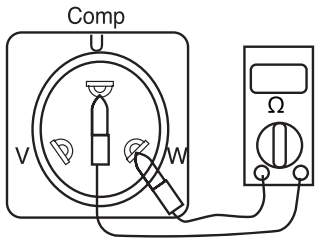

Is the unit installed properly
No
• Check Fan constraint
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove the cause of error
Yes
Is the Compressor Normal?
No
• Check compressor constraint
• Check compressor wire disconnection (open/negative phase)
• Check inside wire open/short
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor.
Yes
Is the outdoor unit PCB Normal?
No
• Check PCB compressor connector assembly status
• Check if PCB IPM burned
• Check IPM input signal connector short-circuit
• Check the balance of current in the compressor operation phase -> the difference between each phase current should be within 2A.
• Remedy : replace PCB Assembly.

• Check for short-circuit of PCB IPM Input Signal Connector.

1. Set as the multi-tester resistance measurement mode.
2. Check the short-circuit between the input signal pins at the IPM(SPM3) lower parts in Power-off state.



• Verifying compressor burn



1. Remove the connectors to the PCB.
2. Measure the resistance between the lines of each terminal of the compressor. (Refer to Table 1)
3. Measure the resistance between each terminal and the chassis(pipe) of the compressor. (Refer to Table 2)
4. If the measurements are distinctively different from Table 1 and 2, the compressor is decided to be burned.

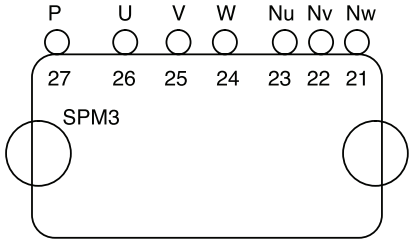
Table 1

Resistance between the lines of each terminal	
U - V	0.5 ~ 1Ω
V - W	0.5 ~ 1Ω
W - U	0.5 ~ 1Ω

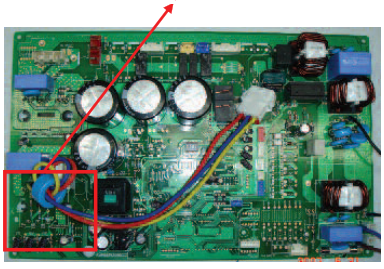
Table 1

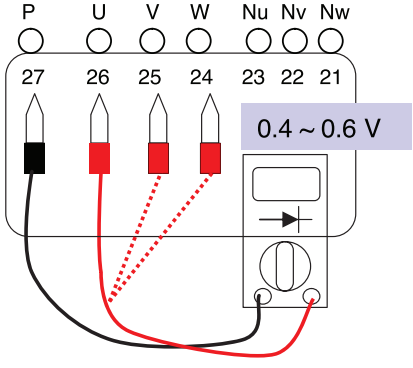
Resistance of terminal insulations	
U - chassis	1MΩ ↑
V - chassis	1MΩ ↑
W - chassis	1MΩ ↑

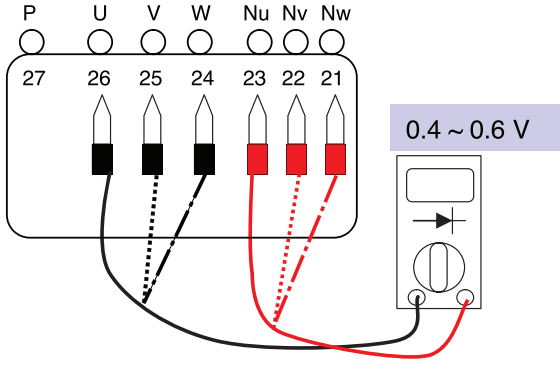
• Verifying IPM burn



1. Remove the connectors to the PCB.
2. Set Multi-tester as Diode voltage measurement mode.
3. Measure voltages of P~U / P~V / P~W as shown in figure 1 below.
4. Measure voltages of U~Nu / V~Nu / W~Nu as shown in figure 2 below.
5. If the measurements are distinctively different as in the figures, the IPM is decided to be burned.



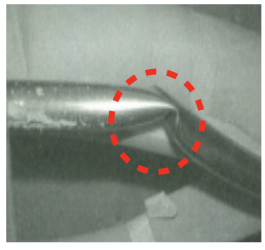




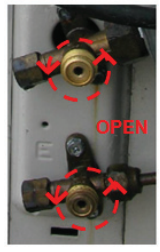
Case of field defect

❑ IPM (Over Current Limit)

❑ Bending/Folding



❑ SVC Valve close

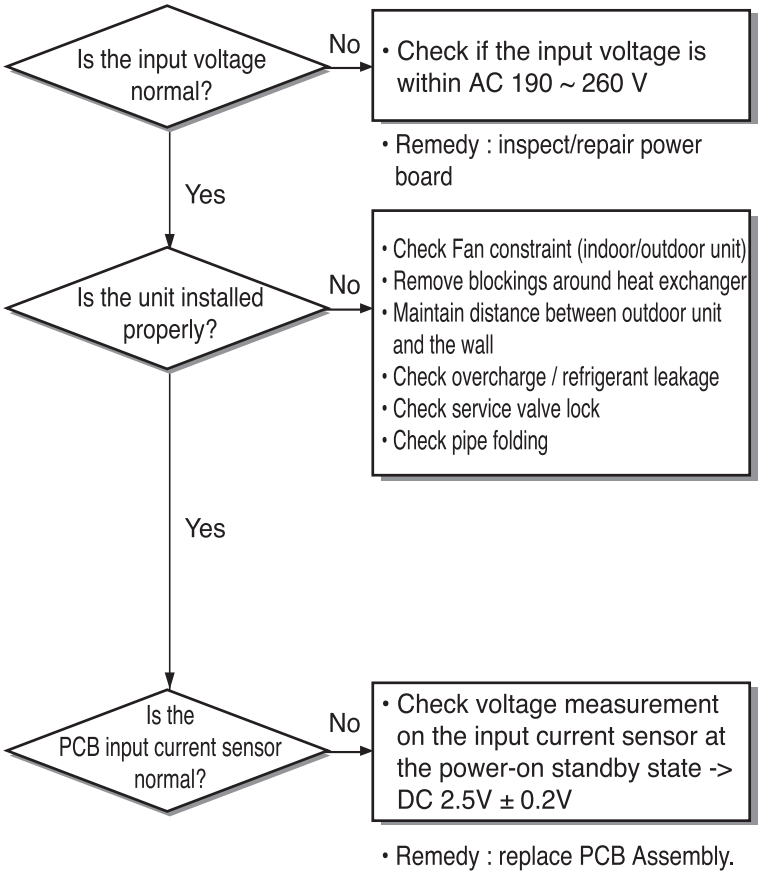


2) CH22: CT2 Error (Input Over-current)

Inspection Number	Error Detection	Cause of Error	Check Point
CH22	AC Input current is higher than the limit.	• Input voltage error(low voltage) • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check input voltage • Check outdoor fan constraint / screened / flow structure • Check PCB current sensor parts

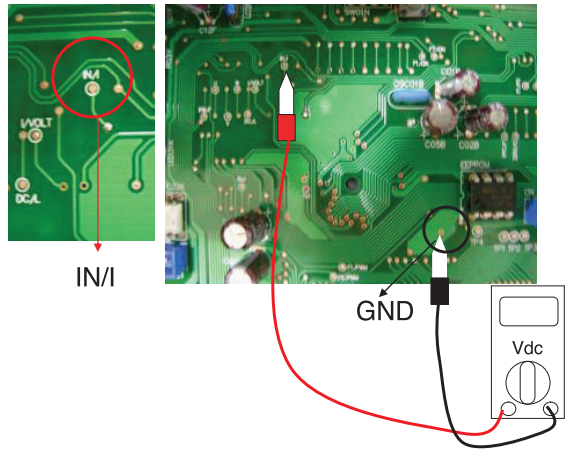
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the input voltage normal?
No
• Check if the input voltage is within AC 190 ~ 260 V
• Remedy : inspect/repair power board
Yes
Is the unit installed properly?
No
• Check Fan constraint (indoor/outdoor unit)
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check overcharge / refrigerant leakage
• Check service valve lock
• Check pipe folding
Yes
Is the PCB input current sensor normal?
No
• Check voltage measurement on the input current sensor at the power-on standby state -> DC 2.5V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB input current sensing circuit

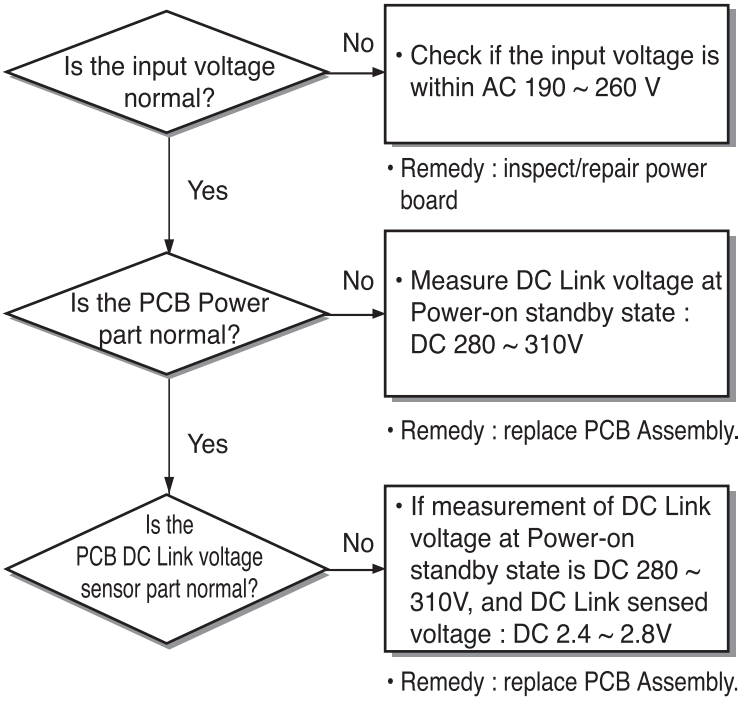
1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.



3) CH23: DC Link Low Voltage Error

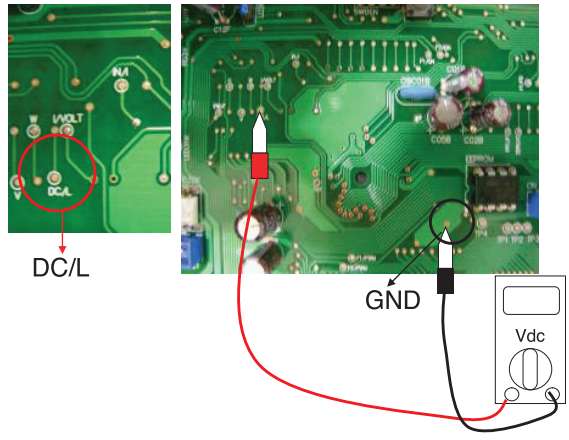
Inspection Number	Error Detection	Cause of Error	Check Point
CH23	DC Link voltage is lower than the limit. (Under DC 140Vrms)	• Input voltage error(low voltage) • Burned parts inside PCB	• Check input voltage • Check PCB DC Link voltage sensor parts

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the input voltage normal?
No
• Check if the input voltage is within AC 190 ~ 260 V
• Remedy : inspect/repair power board
Yes
Is the PCB Power part normal?
No
• Measure DC Link voltage at Power-on standby state : DC 280 ~ 310V
• Remedy : replace PCB Assembly.
Yes
Is the PCB DC Link voltage sensor part normal?
No
• If measurement of DC Link voltage at Power-on standby state is DC 280 ~ 310V, and DC Link sensed voltage : DC 2.4 ~ 2.8V
• Remedy : replace PCB Assembly.

• Inspecting PCB DC Link voltage sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.4 ~ 2.8V, the parts are decided as burned.

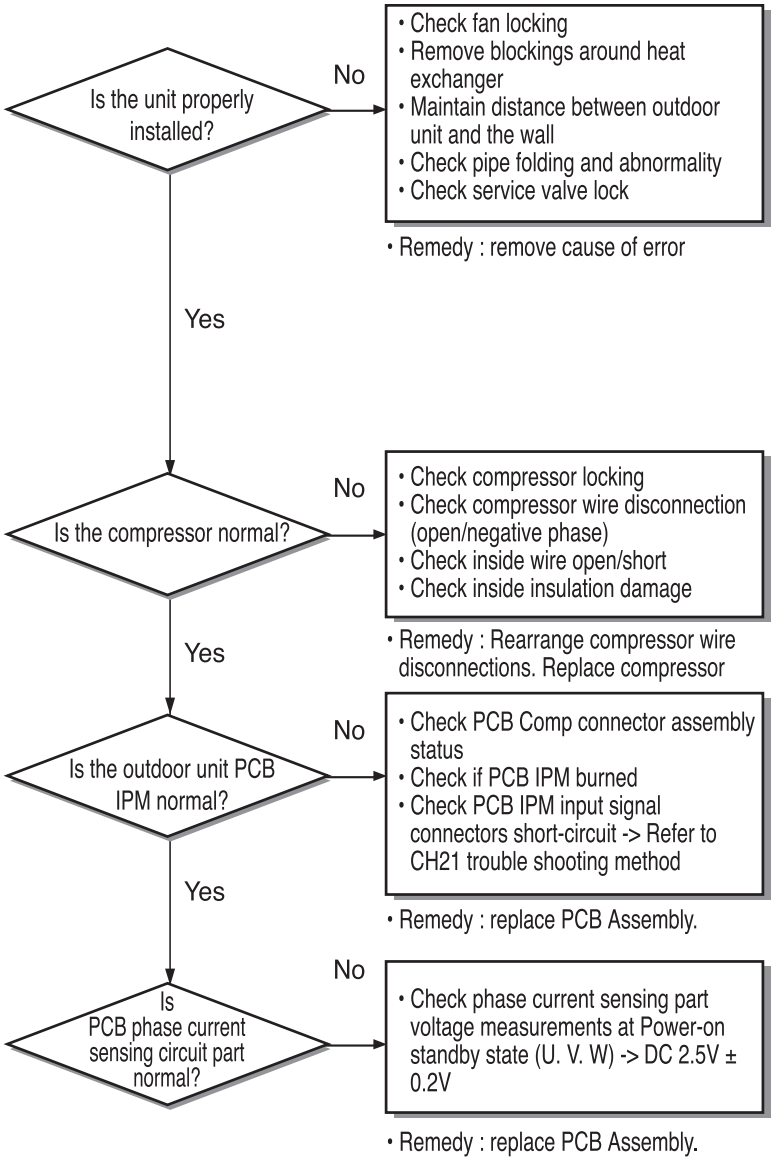


4) CH26: DC Comp Location Sensing Error

Error Code	Error Detection	Cause of Error	Check Point
CH26	Over-current at the initial operation of the compressor / location sensing signal for compressor operation is not input	• Compressor Locking • Overload operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB(IPM) • Burned PCB phase current sensing circuit parts	• Check compressor locking • Compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IMP burned (refer to CH21) • Check on-PCB current sensing circuit parts

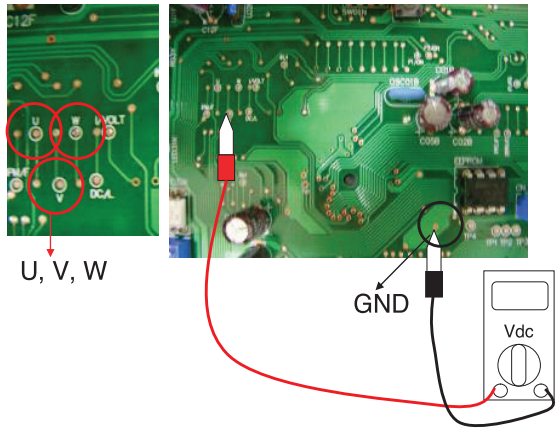
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is the compressor normal?
No
• Check compressor locking
• Check compressor wire disconnection (open/negative phase)
• Check inside wire open/short
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor
Yes
Is the outdoor unit PCB IPM normal?
No
• Check PCB Comp connector assembly status
• Check if PCB IPM burned
• Check PCB IPM input signal connectors short-circuit -> Refer to CH21 trouble shooting method
• Remedy : replace PCB Assembly.
Yes
Is PCB phase current sensing circuit part normal?
No
• Check phase current sensing part voltage measurements at Power-on standby state (U. V. W) -> DC 2.5V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB phase current sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.

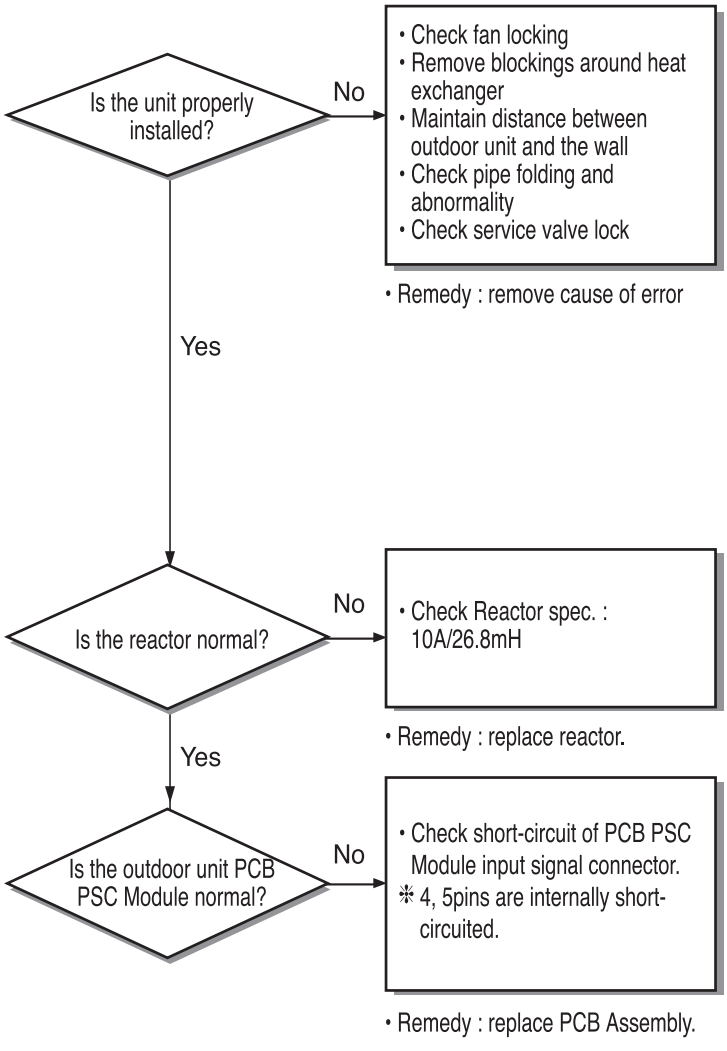


5) CH27: PSC Fault Over-current Error

Error Code	Error Detection	Cause of Error	Check Point
CH27	Over-current on AC->DC converter circuit	• Overload operation (Outdoor fan constraint, screened, blocked) • Wrong application of Reactor Spec. • Burned PCB internal parts (PSC Module)	• Check outdoor fan constraint / screened / flow structure • Check Reactor Spec. : 10A/26.8mH • Check for PCB internal part burn

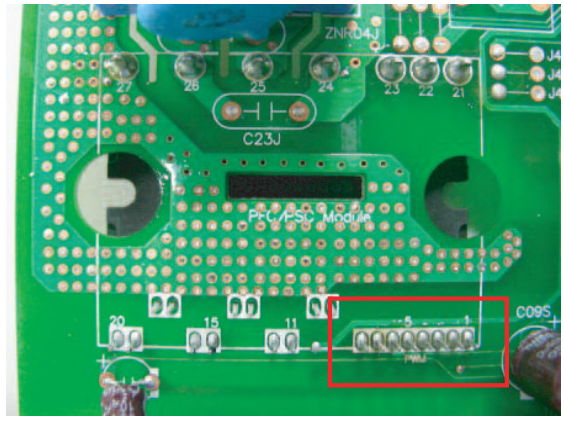
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remove cause of error
Yes
Is the reactor normal?
No
• Check Reactor spec. : 10A/26.8mH
• Remove replace reactor.
Yes
Is the outdoor unit PCB PSC Module normal?
No
• Check short-circuit of PCB PSC Module input signal connector.
❊ 4, 5pins are internally short-circuited.
• Remove replace PCB Assembly.

• Inspecting PCB PSC Module signal input connector short-circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Check the short-circuits between PSC Module lower part input signal pins at Power-off state.



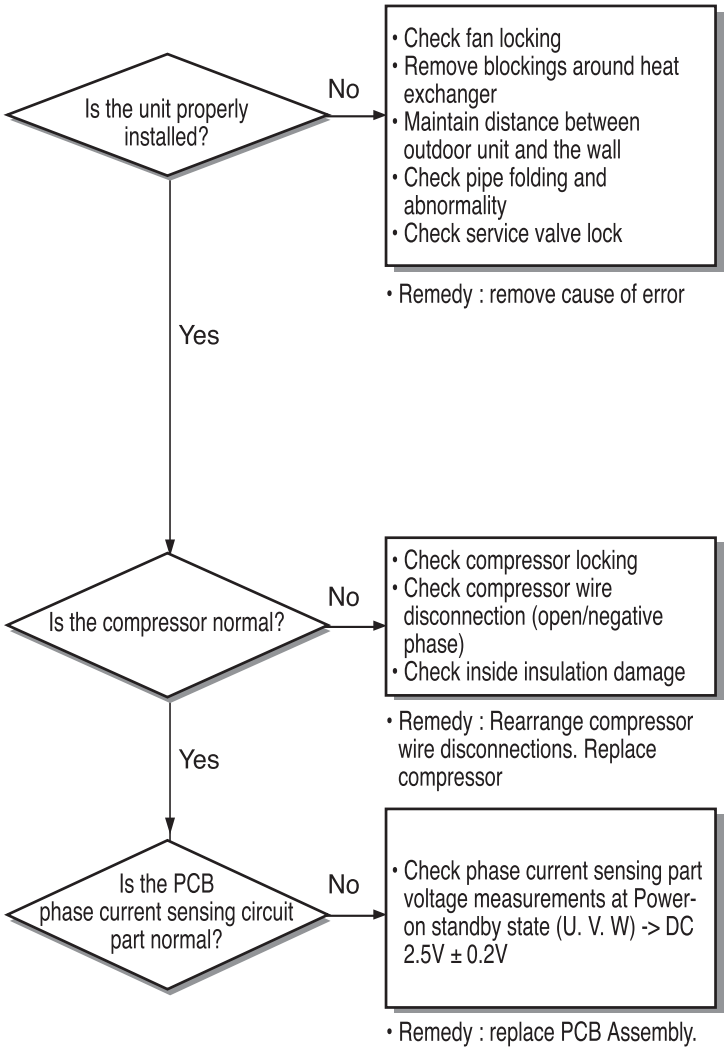
warning PSC Module 4, 5 pins are internally short-circuited

6) CH29: Compressor phase Over-current Error (only verifiable at Outdoor unit PCB Assembly)

Error Code	Error Detection	Cause of Error	Check Point
CH29	Compressor input phase current is high.	• Compressor blocked • Overload operation (Outdoor fan constraint, screened, blocked) • Burned PCB phase current sensor part	• Check compressor locking • Check outdoor fan constraint / screened / flow structure • Check for PCB phase current sensor part

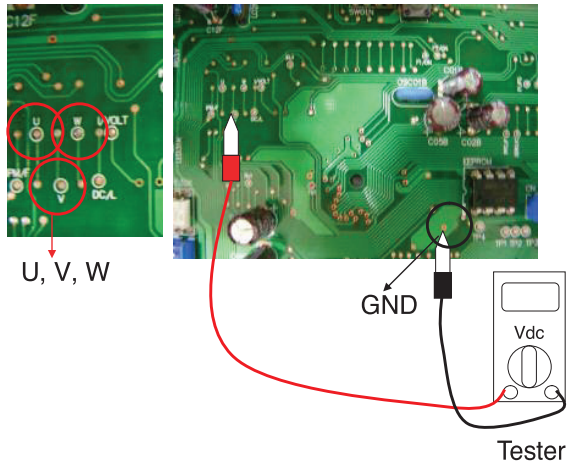
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is the compressor normal?
No
• Check compressor locking
• Check compressor wire disconnection (open/negative phase)
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor
Yes
Is the PCB phase current sensing circuit part normal?
No
• Check phase current sensing part voltage measurements at Power-on standby state (U. V. W) -> DC 2.5V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB phase current sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure at the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.

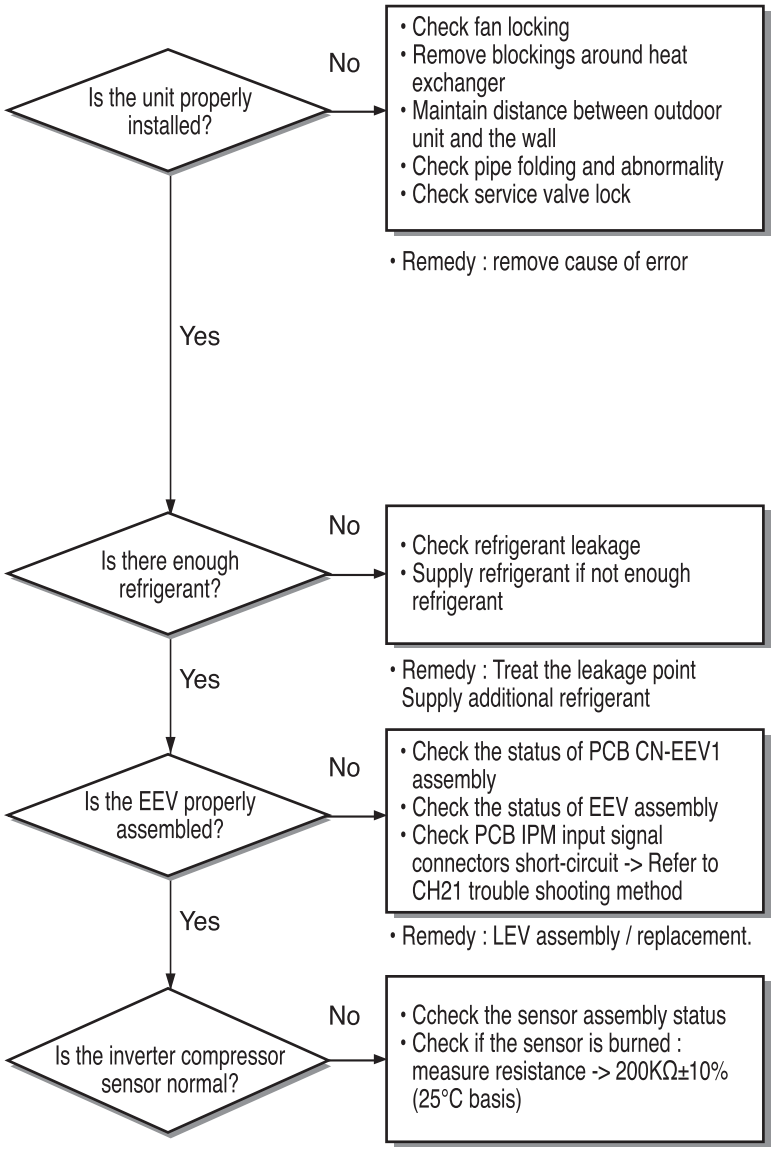


7) CH32: Inverter Compressor D-Pipe Overheat Error

Error Code	Error Detection	Cause of Error	Check Point
CH32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint / screened / flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly

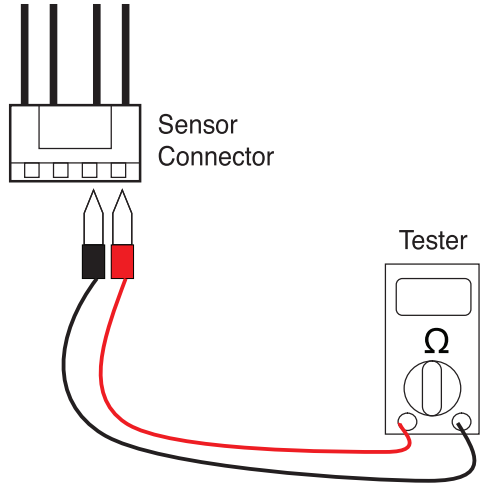
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is there enough refrigerant?
No
• Check refrigerant leakage
• Supply refrigerant if not enough refrigerant
• Remedy : Treat the leakage point Supply additional refrigerant
Yes
Is the EEV properly assembled?
No
• Check the status of PCB CN-EEV1 assembly
• Check the status of EEV assembly
• Check PCB IPM input signal connectors short-circuit -> Refer to CH21 trouble shooting method
• Remedy : LEV assembly / replacement.
Yes
Is the inverter compressor sensor normal?
No
• Ccheck the sensor assembly status
• Check if the sensor is burned : measure resistance -> 200KΩ±10% (25°C basis)

• Inspecting Inverter Compressor Discharge Sensor

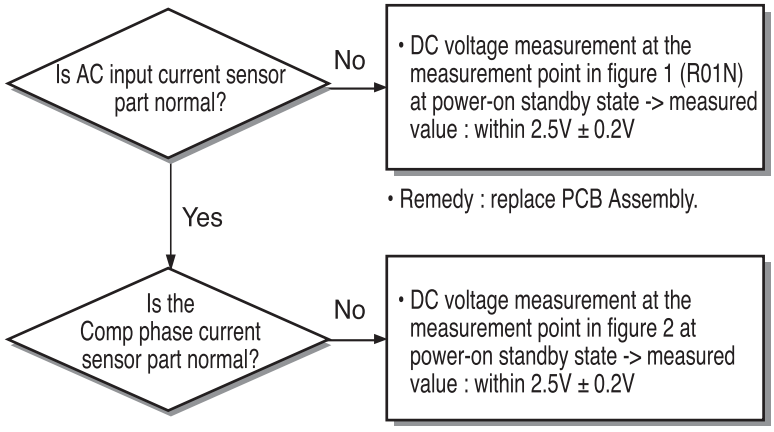
1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of 200KΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



8) CH40: CT Sensor Error (Open/Short)

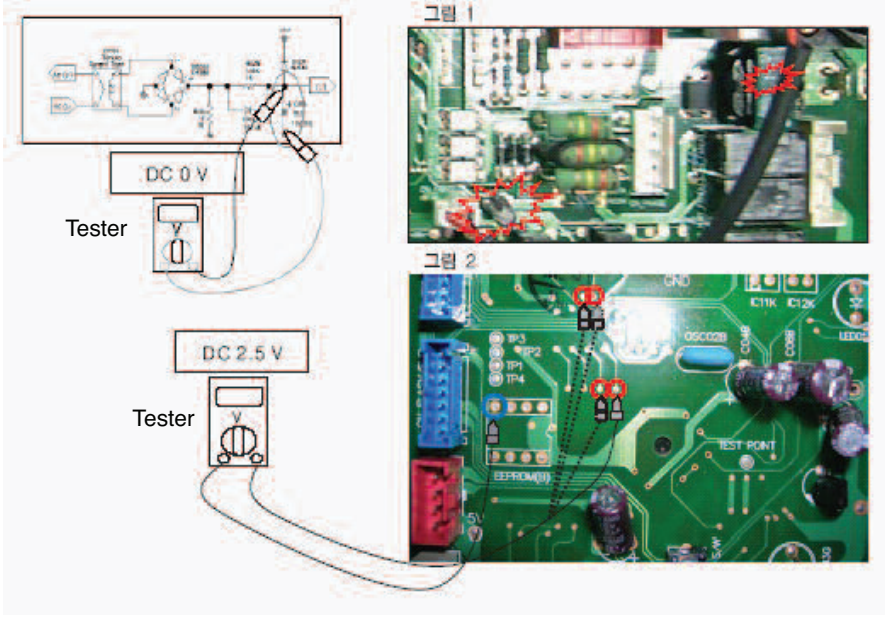
Error Code	Error Detection	Cause of Error	Check Point
CH40	AC Input current / Comp phase current sensing circuit - basic voltage sensing error	• PCB sensing circuit part burned	• Check power input connector, Comp output current sensing circui

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is AC input current sensor part normal?
No
• DC voltage measurement at the measurement point in figure 1 (R01N) at power-on standby state -> measured value : within 2.5V ± 0.2V
• Remedy : replace PCB Assembly.
Yes
Is the Comp phase current sensor part normal?
No
• DC voltage measurement at the measurement point in figure 2 at power-on standby state -> measured value : within 2.5V ± 0.2V

• Inspecting current sensing circuit

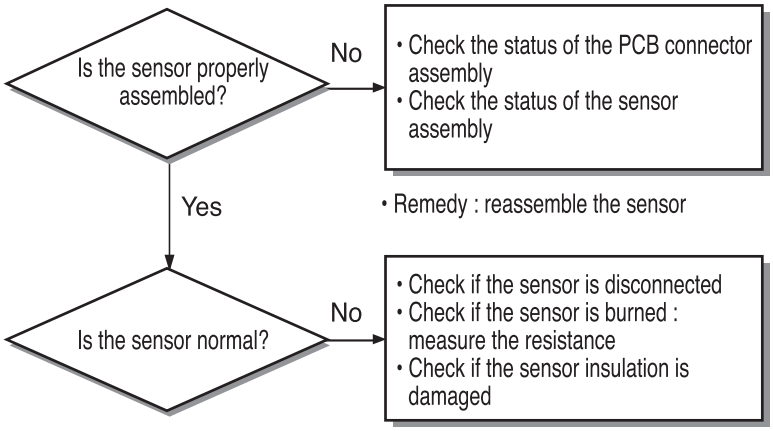
1. Set Multi-tester as DC voltage measurement mode.
2. DC voltage measurement at both end of R01N at power-on standby state -> measured value should be within 2.5V ± 0.2V
3. DC voltage measurement at the measurement point in figure 2 at power-on standby state -> measured value should be within 2.5V ± 0.2V



9) CH41/44/45/65: Inv D-Pipe/Outdoor Inlet/Cond. Pipe/Heat sink Sensor Error

Error Code	Error Detection	Cause of Error	Check Point
CH41	Inv D-Pipe sensor open/short	• Sensor displacement (poor assembly) • Sensor burned (disconnection, insulation damage)	• Check the status of sensor assembly • Check if sensor is burned
CH44	Outdoor Inlet sensor open/short		
CH45	Cond. Pipe sensor open/short		
CH65	B/Diode Heat sink sensor open/short		

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the sensor properly assembled?
No
• Check the status of the PCB connector assembly
• Check the status of the sensor assembly
Yes
• Remedy : reassemble the sensor
Is the sensor normal?
No
• Check if the sensor is disconnected
• Check if the sensor is burned : measure the resistance
• Check if the sensor insulation is damaged

• Inspecting Inverter Compressor Discharge Sensor

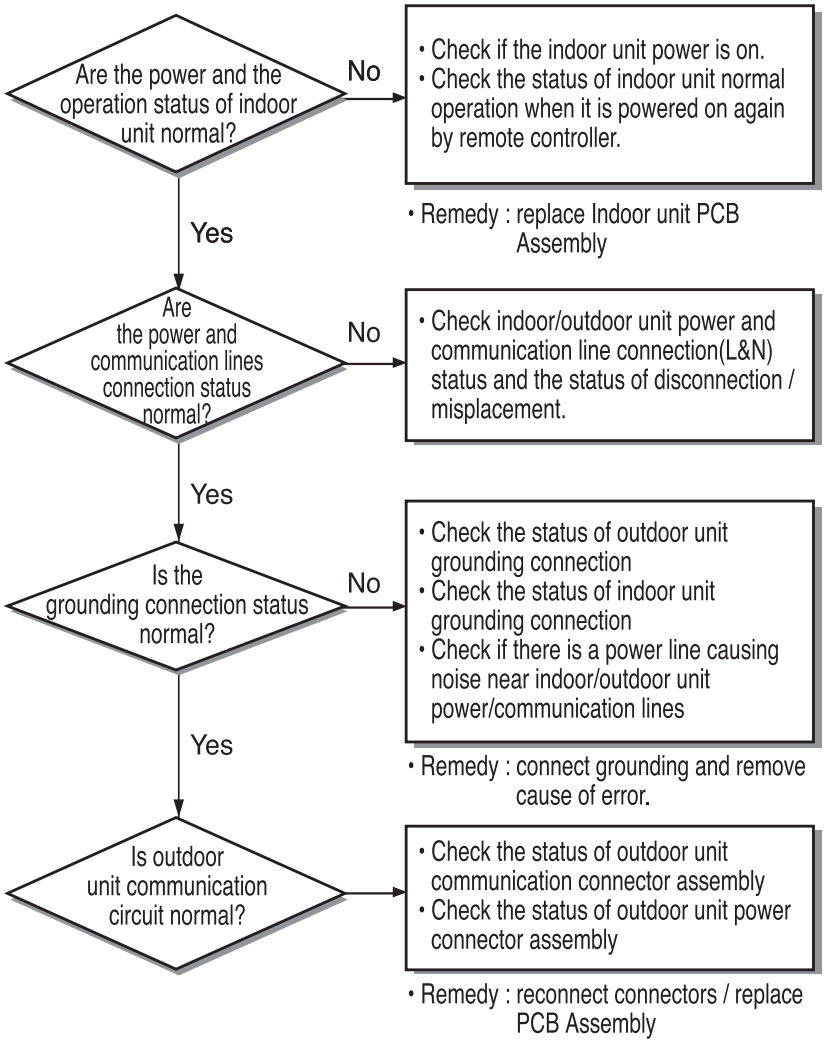
1. Set Multi-tester as resistance measurement mode.
2. Measure resistance between the sensor connectors
3. Check if the sensor insulation is damaged -> Measure resistance between sensor connector pin and the unit assembly pipe. (1MΩ or more)

Sensor Resistance Value (25°C basis)	
Inv D-Pipe Sensor	200k
Outdoor Inlet Sensor	10k
Cond. Pipe Sensor	5k
B/Diode Heat Sink Sensor	10k

10) CH53: Outdoor Unit <-> Indoor Unit Communication Error

Error Code	Error Detection	Cause of Error	Check Point
CH53	If the data transmitted by the indoor unit is not received for 3 minutes continuously.	• No power on indoor unit • Indoor/outdoor unit Power connection error / communication line not installed • Communication error caused by external noise • Indoor/outdoor unit communication circuit parts burned	• Check indoor unit power status • Check indoor/outdoor unit power/communication line disconnection • Check the status of indoor/outdoor unit ground connections • Check if outdoor unit communication parts are burned

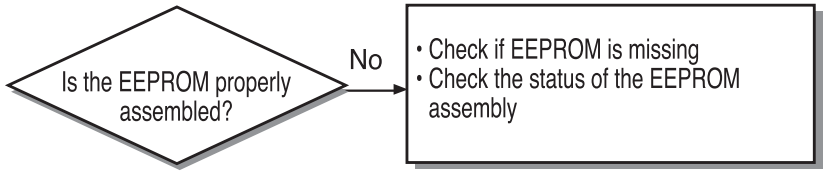
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Are the power and the operation status of indoor unit normal?
No
• Check if the indoor unit power is on.
• Check the status of indoor unit normal operation when it is powered on again by remote controller.
• Remedy : replace Indoor unit PCB Assembly
Yes
Are the power and communication lines connection status normal?
No
• Check indoor/outdoor unit power and communication line connection(L&N) status and the status of disconnection / misplacement.
Yes
Is the grounding connection status normal?
No
• Check the status of outdoor unit grounding connection
• Check the status of indoor unit grounding connection
• Check if there is a power line causing noise near indoor/outdoor unit power/communication lines
• Remedy : connect grounding and remove cause of error.
Yes
Is outdoor unit communication circuit normal?
• Check the status of outdoor unit communication connector assembly
• Check the status of outdoor unit power connector assembly
• Remedy : reconnect connectors / replace PCB Assembly

11) CH60: Outdoor Unit PCB EEPROM Error

Error Code	Error Detection	Cause of Error	Check Point
CH60	Incorrect checksum of outdoor unit PCB EEPROM	• Outdoor unit PCB EEPROM misapplied • Outdoor unit PCB EEPROM poor assembly	EEPROM assembly

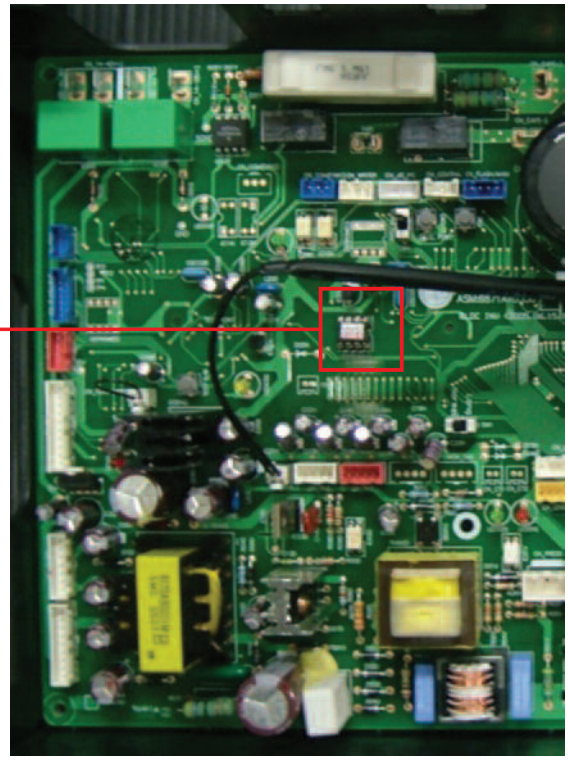
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Remedy : reassemble EEPROM / Replace PCB Assembly

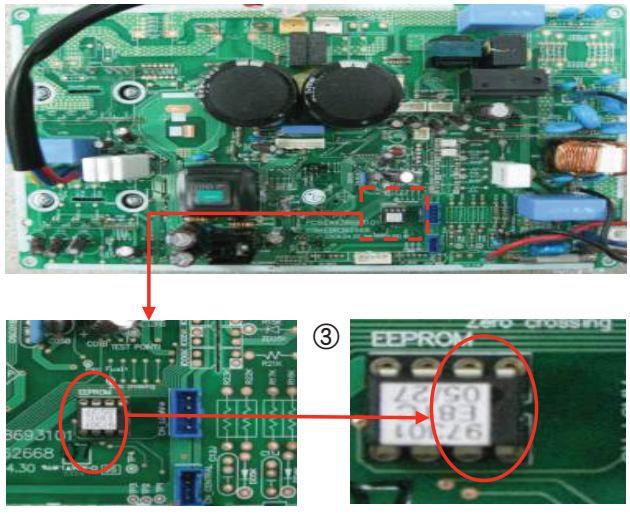
• Inspecting Outdoor EEPROM Assembly Status

1. Check the consistency of the EEPROM's direction inserted in the socket and the EEPROM marking.
2. Check if the EEPROM is securely inserted in the socket. (poor connection)
3. Check if the EEPROM Lead Pin is missing in the socket.



Check Method

① ② ③

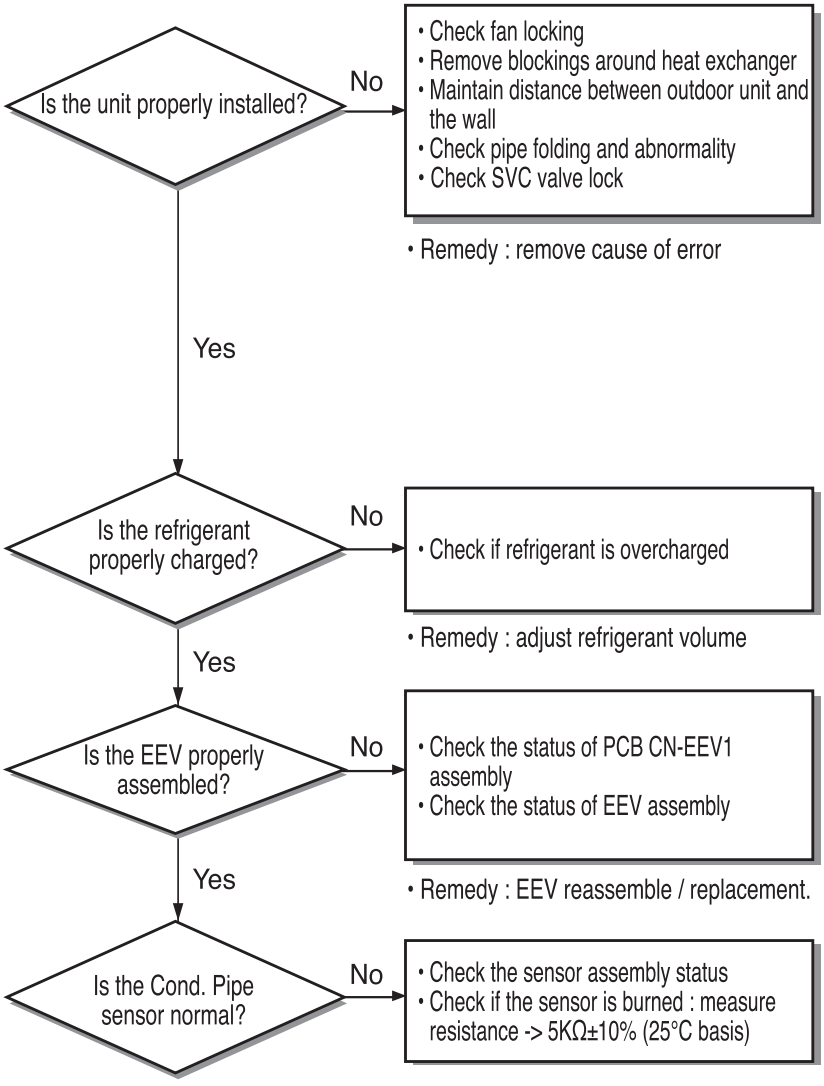


12) CH61: Cond. Pipe Overheat Error

Error Code	Error Detection	Cause of Error	Check Point
CH61	High temperature in Cond. Pipe	• Overload operation (Fan constraint, screened, blocked) • Heat exchanger contaminated • EEV connector displaced / poor EEV assembly • Poor Cond. Pipe sensor assembly / burned	• Check fan constraint / screened / flow structure • Check if refrigerant overcharged • Check the status of EEV assembly • Check the status of sensor assembly / burn

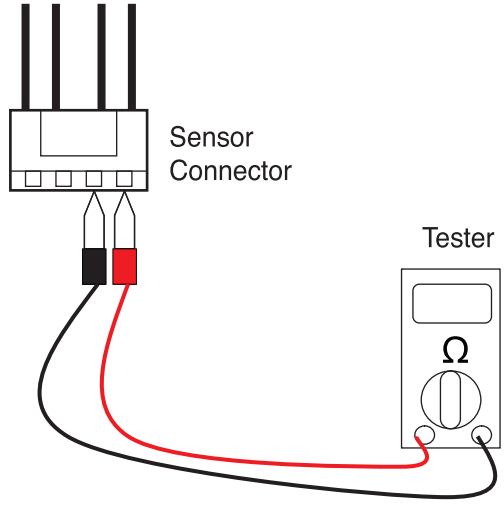
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check SVC valve lock
• Remove : remove cause of error
Yes
Is the refrigerant properly charged?
No
• Check if refrigerant is overcharged
• Remedy : adjust refrigerant volume
Yes
Is the EEV properly assembled?
No
• Check the status of PCB CN-EEV1 assembly
• Check the status of EEV assembly
• Remedy : EEV reassemble / replacement.
Yes
Is the Cond. Pipe sensor normal?
No
• Check the sensor assembly status
• Check if the sensor is burned : measure resistance -> 5KΩ±10% (25°C basis)

• Inspecting Cond. Pipe Sensor

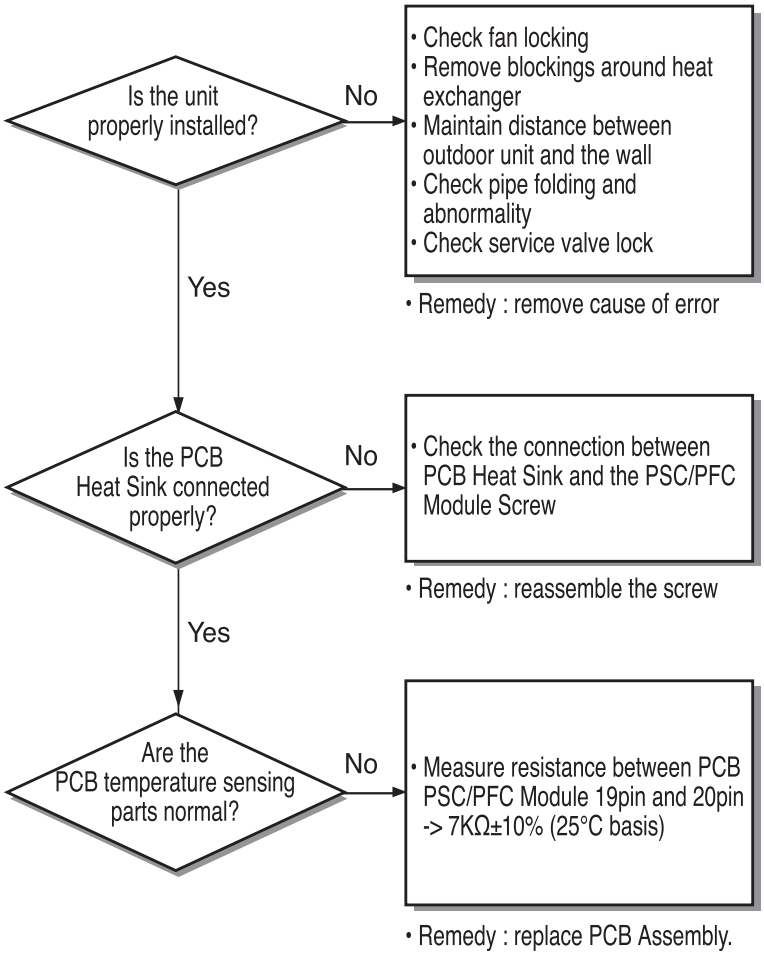
1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between rated speed Comp Discharge sensor connector pins.
3. Measure resistance value of 5kΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



13) CH62: Heat Sink Overheat Error

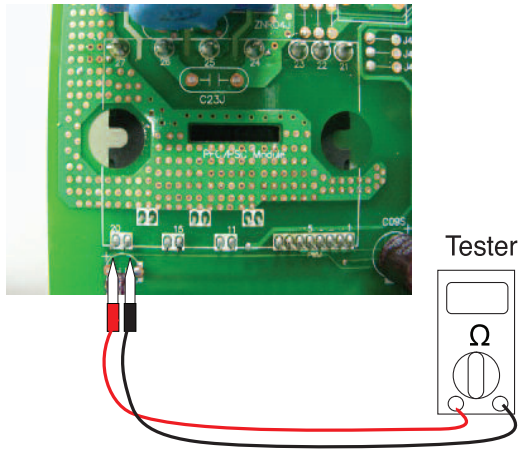
Error Code	Error Detection	Cause of Error	Check Point
CH62	High temperature in outdoor PCB Heat Sink	• Overload operation (Outdoor fan constraint, screened, blocked) • Poor PCB Heat Sink assembly • Poor PCB temperature sensing circuit parts	• Check outdoor fan constraint / screened / flow structure • Check for the status of the PCB Heat sink connection • Check PCB temperature sensing parts

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is the PCB Heat Sink connected properly?
No
• Check the connection between PCB Heat Sink and the PSC/PFC Module Screw
• Remedy : reassemble the screw
Yes
Are the PCB temperature sensing parts normal?
No
• Measure resistance between PCB PSC/PFC Module 19pin and 20pin -> 7KΩ±10% (25°C basis)
• Remedy : replace PCB Assembly.

• Inspecting PCB PSC/PFC Module temperature sensing part

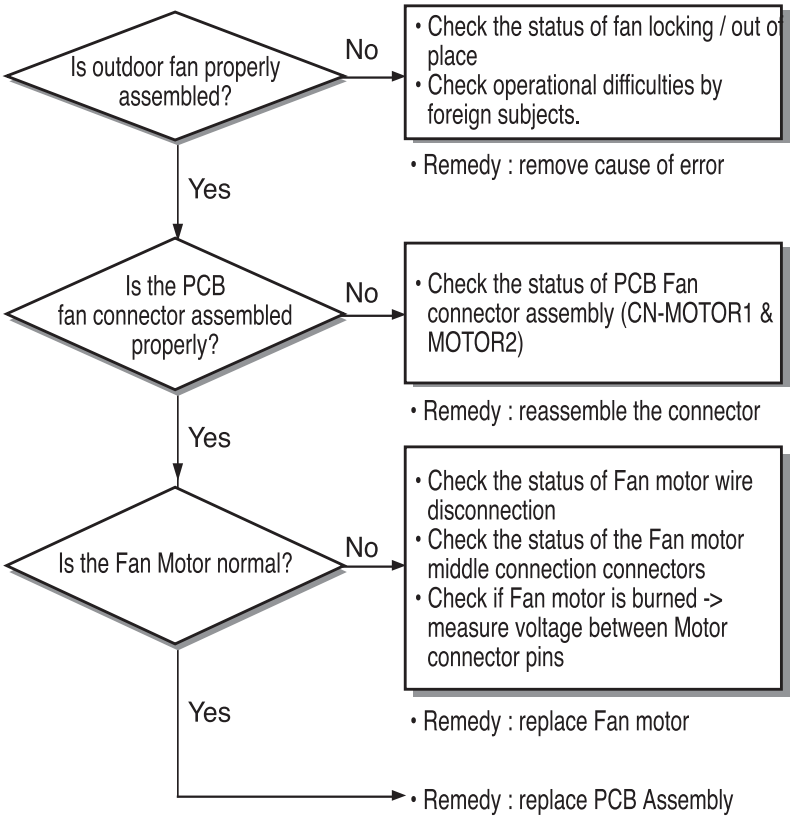
1. Set Multi-tester as resistance measurement mode.
2. Measure resistance between PSC/PFC Module pins 19 ~ 20 at power off state.
3. Measured resistance value of 7KΩ±10%, 25°C basis



14) CH67: Outdoor BLDC Fan Lock Error

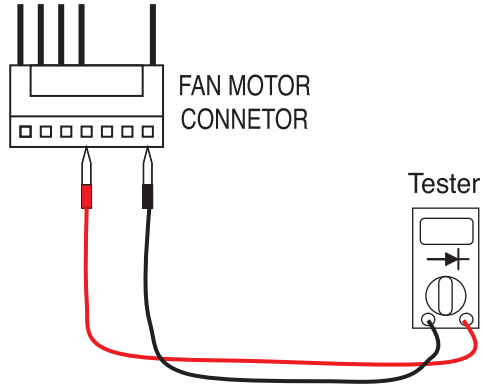
Error Code	Error Detection	Cause of Error	Check Point
CH67	The outdoor unit BLDC Fan operation F/Back signal does not come on	• Outdoor BLDC Fan Lock • PCB Fan connector displaced • BLDC Fan motor burned / wire disconnected • PCB BLDC Fan operation circuit burned	• Check for the status of outdoor fan assembly • Check for the status of the PCB Fan connector assembly • Check Fan motor wire disconnection • Check if Fan motor burned

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is outdoor fan properly assembled?
No
• Check the status of fan locking / out of place
• Check operational difficulties by foreign subjects.
• Remedy : remove cause of error
Yes
Is the PCB fan connector assembled properly?
No
• Check the status of PCB Fan connector assembly (CN-MOTOR1 & MOTOR2)
• Remedy : reassemble the connector
Yes
Is the Fan Motor normal?
No
• Check the status of Fan motor wire disconnection
• Check the status of the Fan motor middle connection connectors
• Check if Fan motor is burned -> measure voltage between Motor connector pins
• Remedy : replace Fan motor
Yes
• Remedy : replace PCB Assembly

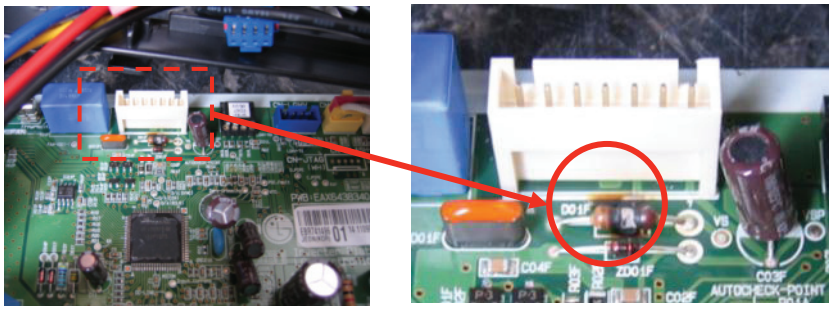
• Inspecting Outdoor BLDC Fan Motor burn

1. Set Multi-tester as Diode voltage measurement mode.
2. Measure voltage between Fan motor connector pin 1 and pin 4 at power off state.
3. Measured voltage value of 1V ± 0.2V means the motor is internally burned.



Case of field defect

❑ BLDC Fan Motor (short)



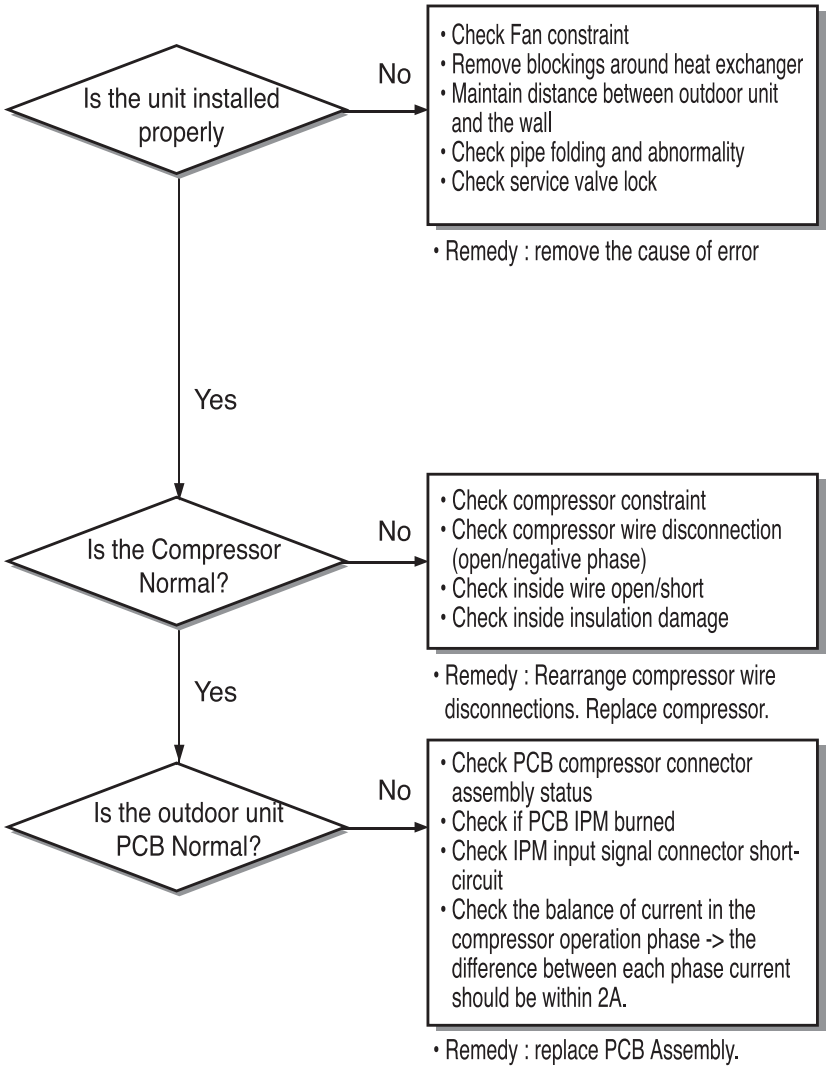
■ Trouble Shooting Guide [Outdoor Unit(1 LED Type)]

1) CH21: DC Peak Error

Inspection Number	Error Detection	Cause of Error	Check Point
CH21	High current into the compressor	• Compressor blocked • Disconnection/short-circuit inside compressor • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check compressor constraint • Check compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IPM burned

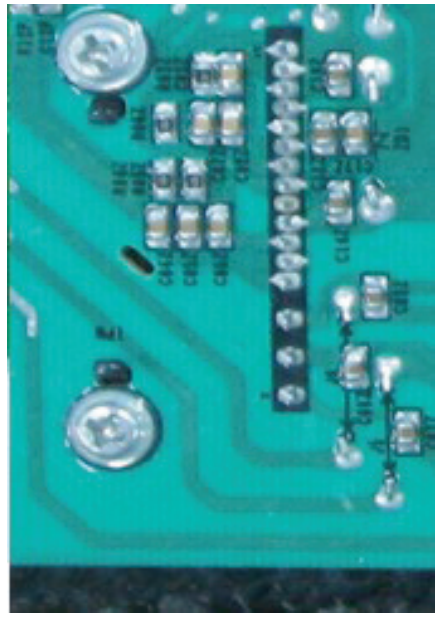
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.

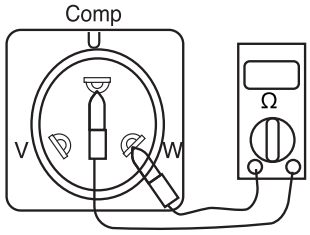

Is the unit installed properly
No
• Check Fan constraint
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove the cause of error
Yes
Is the Compressor Normal?
No
• Check compressor constraint
• Check compressor wire disconnection (open/negative phase)
• Check inside wire open/short
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor.
Yes
Is the outdoor unit PCB Normal?
No
• Check PCB compressor connector assembly status
• Check if PCB IPM burned
• Check IPM input signal connector short-circuit
• Check the balance of current in the compressor operation phase -> the difference between each phase current should be within 2A.
• Remedy : replace PCB Assembly.

• Check for short-circuit of PCB IPM Input Signal Connector.

1. Set as the multi-tester resistance measurement mode.
2. Check the short-circuit between the input signal pins at the IPM(SPM3) lower parts in Power-off state.



• Verifying compressor burn



1. Remove the connectors to the PCB.
2. Measure the resistance between the lines of each terminal of the compressor. (Refer to Table 1)
3. Measure the resistance between each terminal and the chassis(pipe) of the compressor. (Refer to Table 2)
4. If the measurements are distinctively different from Table 1 and 2, the compressor is decided to be burned.

Table 1

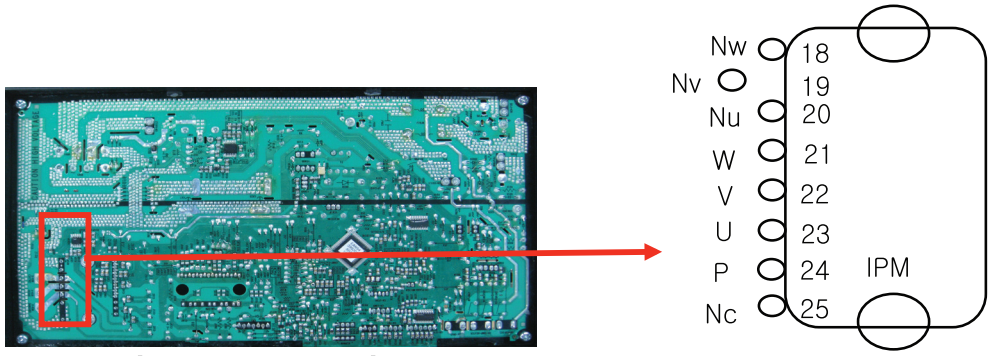
Resistance between the lines of each	
U - V	1.5 ~ 2
V - W	1.5 ~ 2
W - U	1.5 ~ 2

Table 1

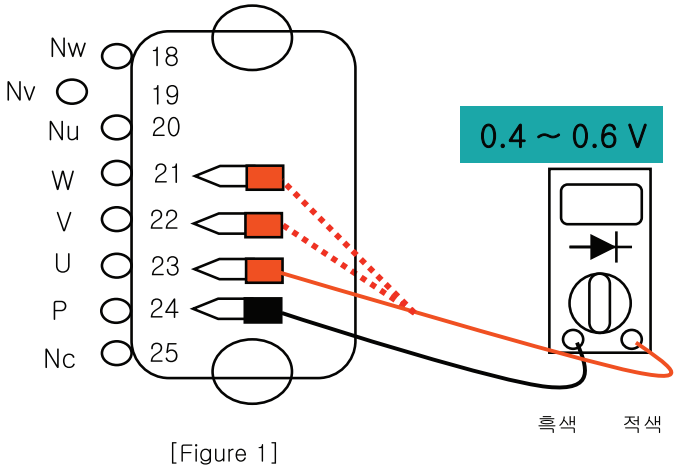
Resistance of terminal insulations	
U - chassis	1MΩ ↑
V - chassis	1MΩ ↑
W - chassis	1MΩ ↑

• Verifying IPM burn

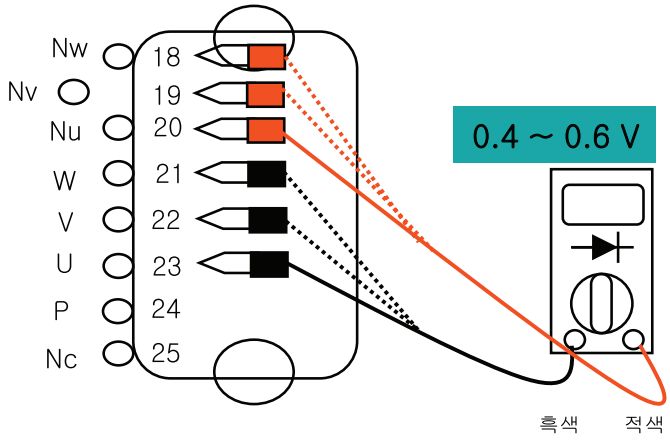
1. Remove the connectors to the PCB.
2. Set Multi-tester as Diode voltage measurement mode.
3. Measure voltages of P~U / P~V / P~W as shown in figure 1 below.
4. Measure voltages of U~Nu / V~Nu / W~Nu as shown in figure 2 below.
5. If the measurements are distinctively different as in the figures, the IPM is decided to be burned.



[IPM 위치 및 Pin 번호]♪



[Figure 1]



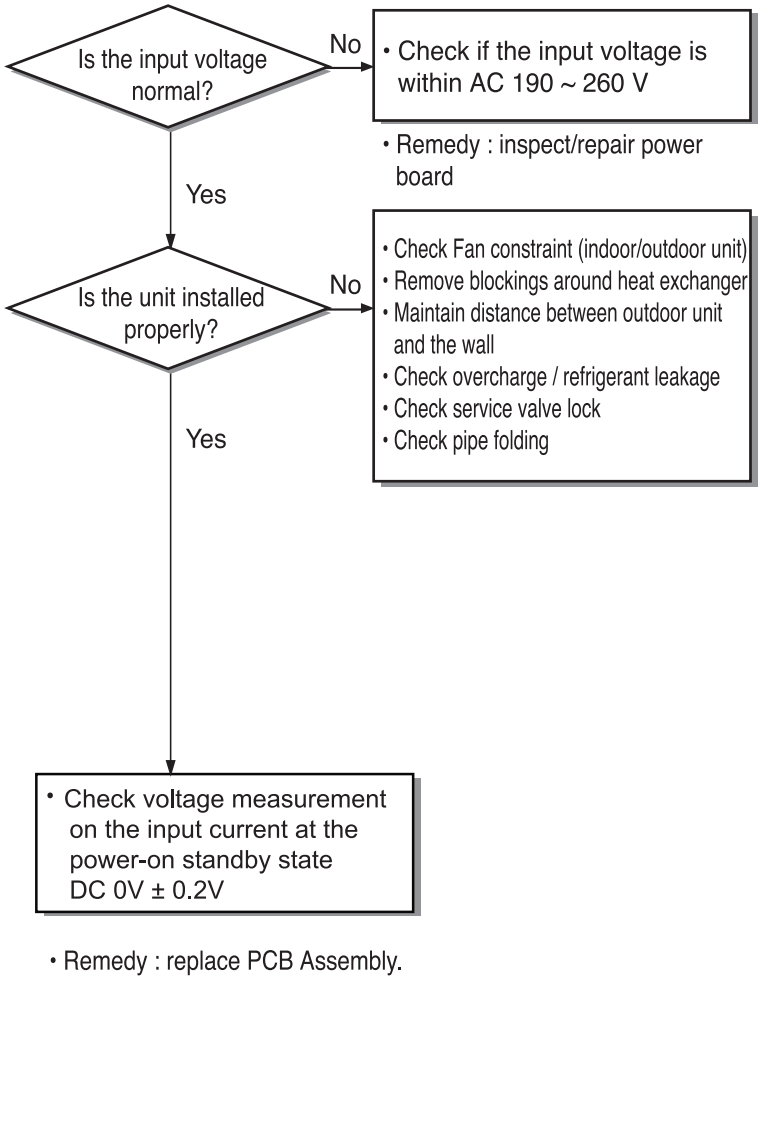
[Figure 2]

2) CH22: CT2 Error (Input Over-current)

Inspection Number	Error Detection	Cause of Error	Check Point
CH22	AC Input current is higher than the limit.	• Input voltage error(low voltage) • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check input voltage • Check outdoor fan constraint / screened / flow structure • Check PCB current sensor parts

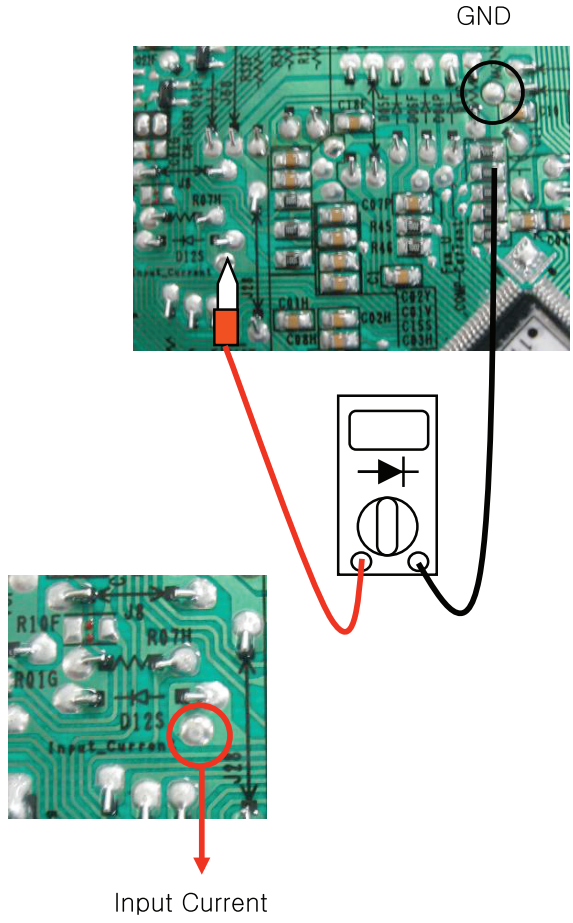
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the input voltage normal?
No
• Check if the input voltage is within AC 190 ~ 260 V
• Remedy : inspect/repair power board
Yes
Is the unit installed properly?
No
• Check Fan constraint (indoor/outdoor unit)
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check overcharge / refrigerant leakage
• Check service valve lock
• Check pipe folding
Yes
• Check voltage measurement on the input current at the power-on standby state DC 0V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB input current sensing circuit

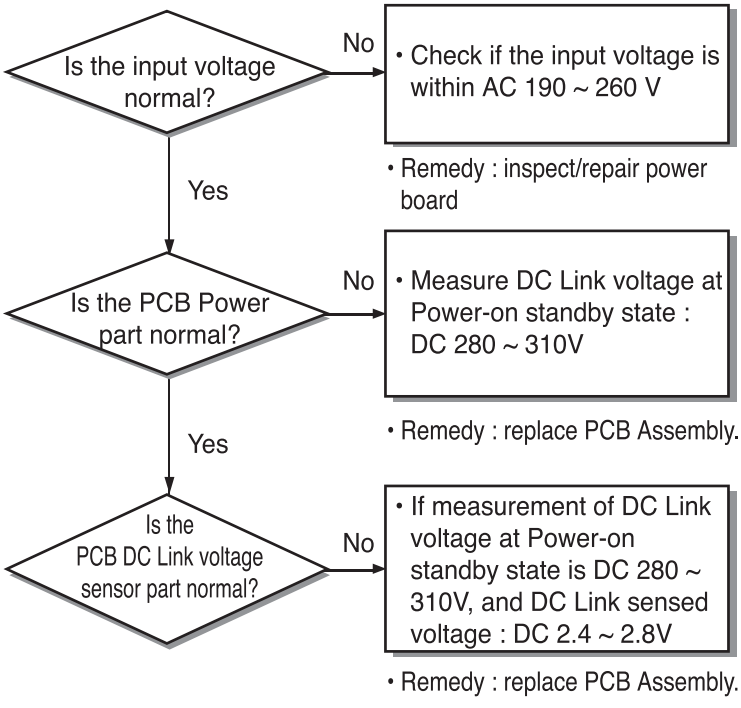
1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.



3) CH23: DC Link Low Voltage Error

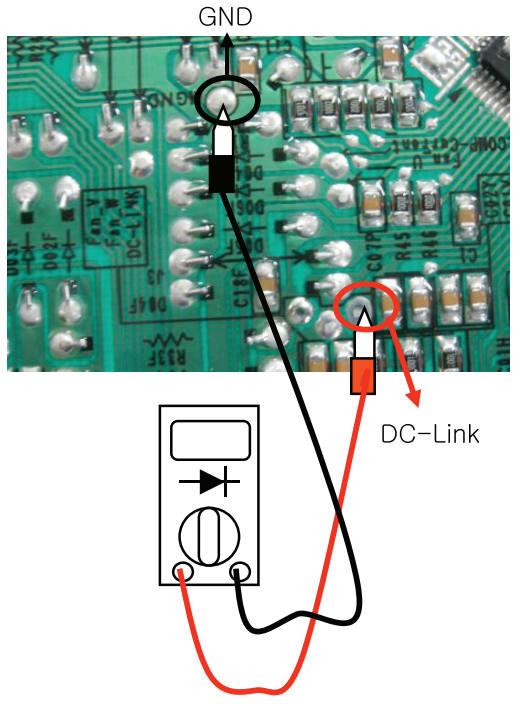
Inspection Number	Error Detection	Cause of Error	Check Point
CH23	DC Link voltage is lower than the limit. (Under DC 140Vrms)	• Input voltage error(low voltage) • Burned parts inside PCB	• Check input voltage • Check PCB DC Link voltage sensor parts

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the input voltage normal?
No
• Check if the input voltage is within AC 190 ~ 260 V
• Remedy : inspect/repair power board
Yes
Is the PCB Power part normal?
No
• Measure DC Link voltage at Power-on standby state : DC 280 ~ 310V
• Remedy : replace PCB Assembly.
Yes
Is the PCB DC Link voltage sensor part normal?
No
• If measurement of DC Link voltage at Power-on standby state is DC 280 ~ 310V, and DC Link sensed voltage : DC 2.4 ~ 2.8V
• Remedy : replace PCB Assembly.

• Inspecting PCB DC Link voltage sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.4 ~ 2.8V, the parts are decided as burned.

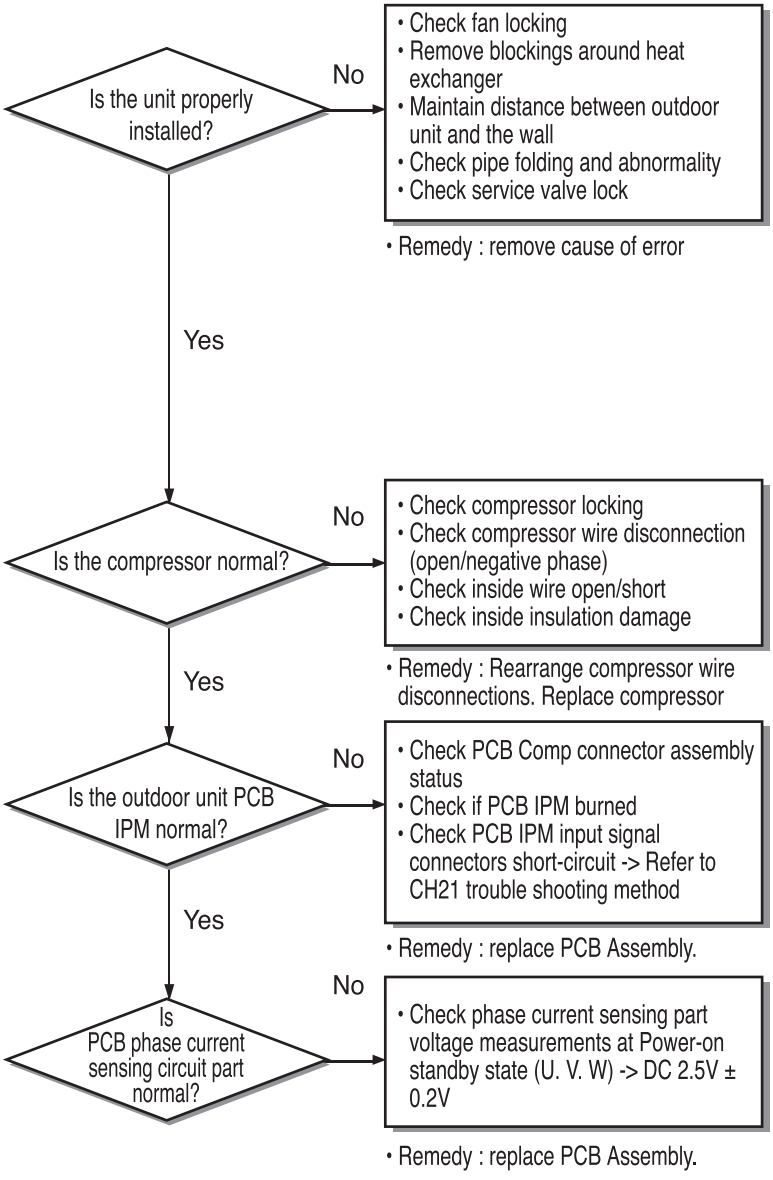


4) CH26: DC Comp Location Sensing Error

Error Code	Error Detection	Cause of Error	Check Point
CH26	Over-current at the initial operation of the compressor / location sensing signal for compressor operation is not input	• Compressor Locking • Overload operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB(IPM) • Burned PCB phase current sensing circuit parts	• Check compressor locking • Compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IMP burned (refer to CH21) • Check on-PCB current sensing circuit parts

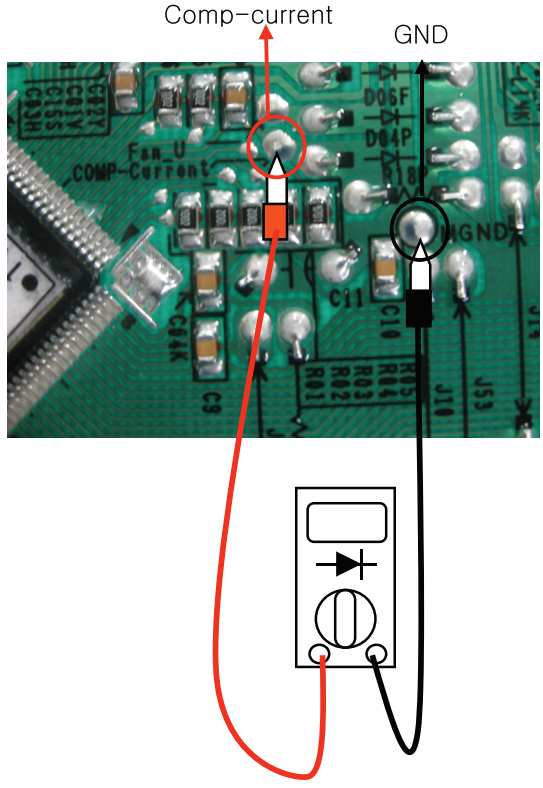
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is the compressor normal?
No
• Check compressor locking
• Check compressor wire disconnection (open/negative phase)
• Check inside wire open/short
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor
Yes
Is the outdoor unit PCB IPM normal?
No
• Check PCB Comp connector assembly status
• Check if PCB IPM burned
• Check PCB IPM input signal connectors short-circuit -> Refer to CH21 trouble shooting method
• Remedy : replace PCB Assembly.
Yes
Is PCB phase current sensing circuit part normal?
No
• Check phase current sensing part voltage measurements at Power-on standby state (U. V. W) -> DC 2.5V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB phase current sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.

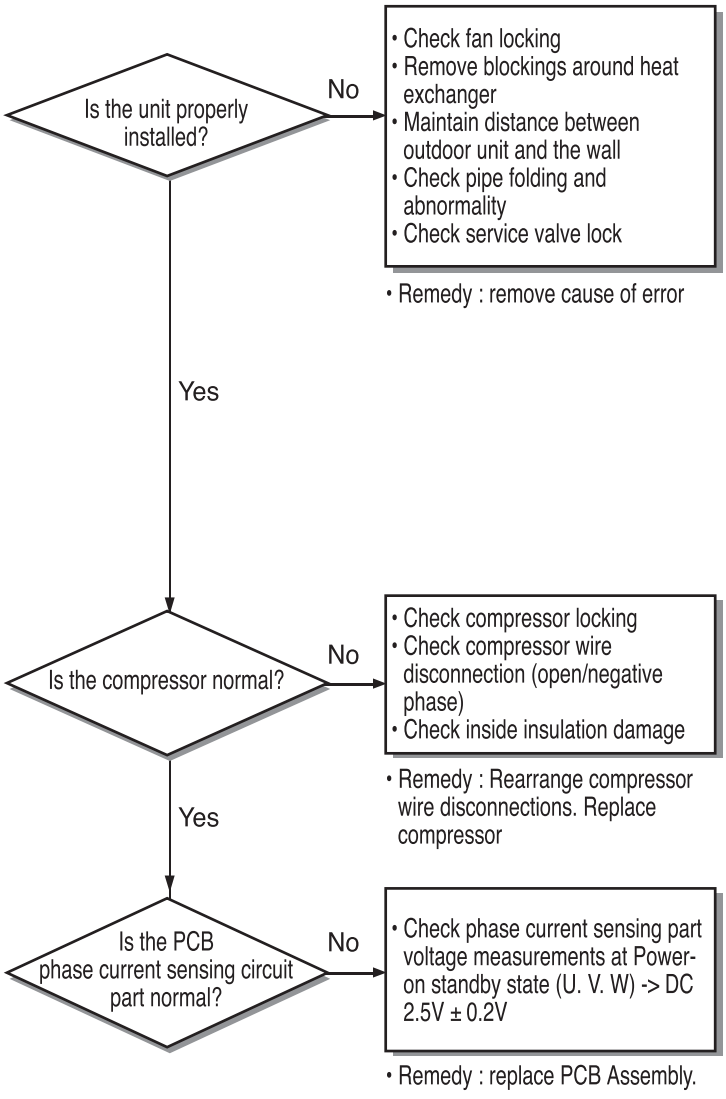


5) CH29: Compressor phase Over-current Error (only verifiable at Outdoor unit PCB Assembly)

Error Code	Error Detection	Cause of Error	Check Point
CH29	Compressor input phase current is high.	• Compressor blocked • Overload operation (Outdoor fan constraint, screened, blocked) • Burned PCB phase current sensor part	• Check compressor locking • Check outdoor fan constraint / screened / flow structure • Check for PCB phase current sensor part

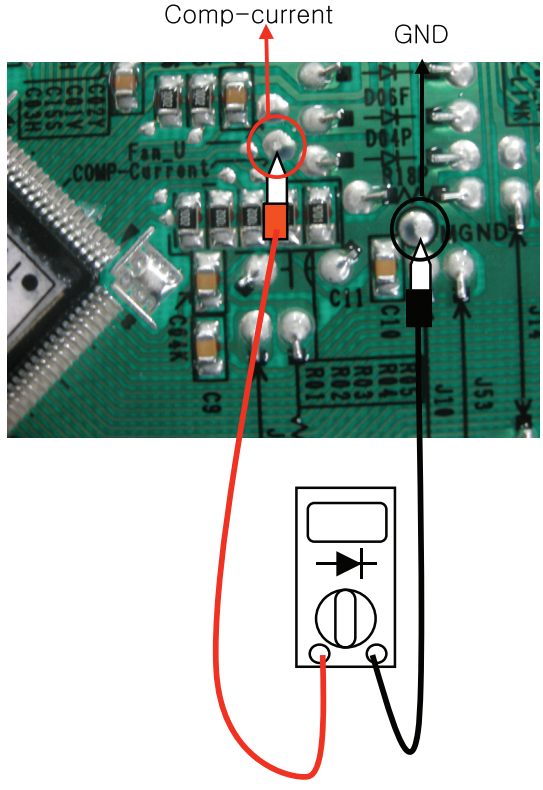
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is the compressor normal?
No
• Check compressor locking
• Check compressor wire disconnection (open/negative phase)
• Check inside insulation damage
• Remedy : Rearrange compressor wire disconnections. Replace compressor
Yes
Is the PCB phase current sensing circuit part normal?
No
• Check phase current sensing part voltage measurements at Power-on standby state (U. V. W) -> DC 2.5V ± 0.2V
• Remedy : replace PCB Assembly.

• Inspecting PCB phase current sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure at the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.

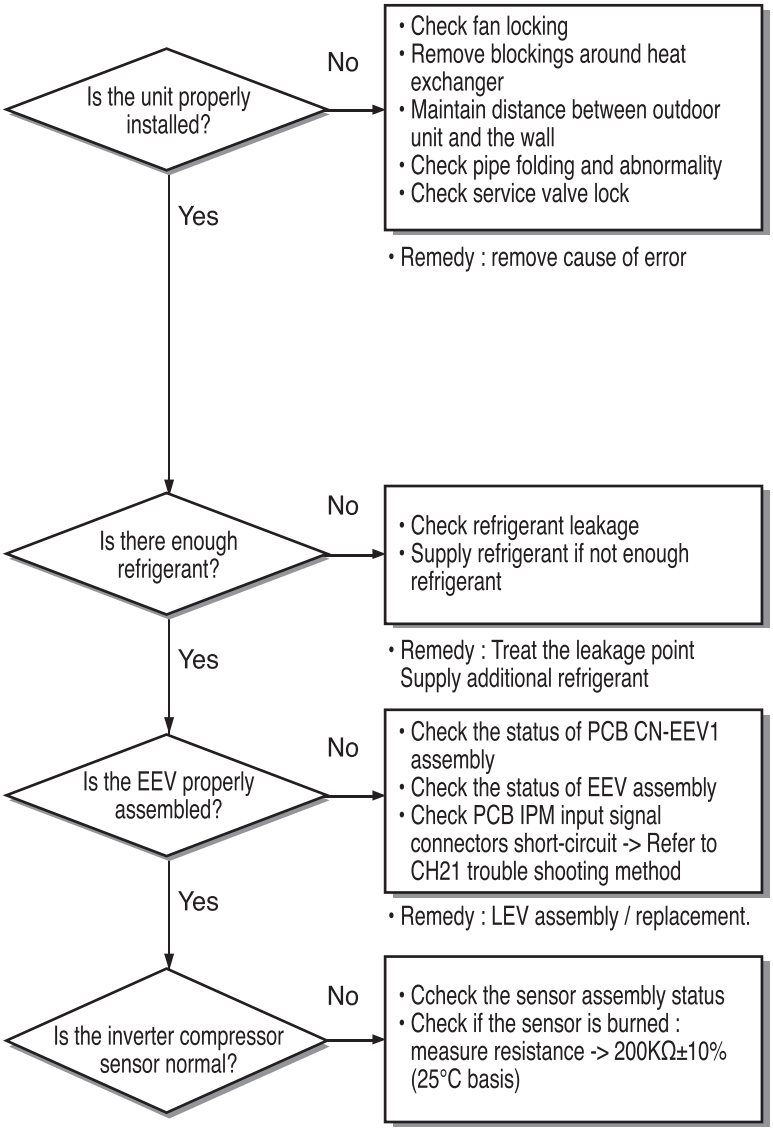


6) CH32: Inverter Compressor D-Pipe Overheat Error

Error Code	Error Detection	Cause of Error	Check Point
CH32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint / screened / flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly

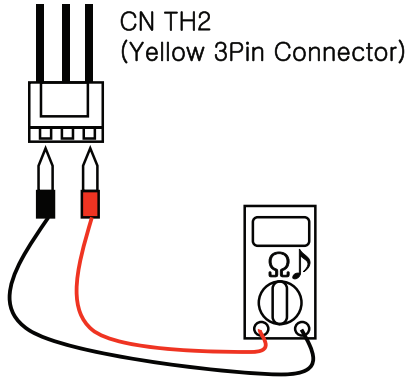
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remedy : remove cause of error
Yes
Is there enough refrigerant?
No
• Check refrigerant leakage
• Supply refrigerant if not enough refrigerant
• Remedy : Treat the leakage point Supply additional refrigerant
Yes
Is the EEV properly assembled?
No
• Check the status of PCB CN-EEV1 assembly
• Check the status of EEV assembly
• Check PCB IPM input signal connectors short-circuit -> Refer to CH21 trouble shooting method
• Remedy : LEV assembly / replacement.
Yes
Is the inverter compressor sensor normal?
No
• Ccheck the sensor assembly status
• Check if the sensor is burned : measure resistance -> 200KΩ±10% (25°C basis)

- **Inspecting Inverter Compressor Discharge Sensor**

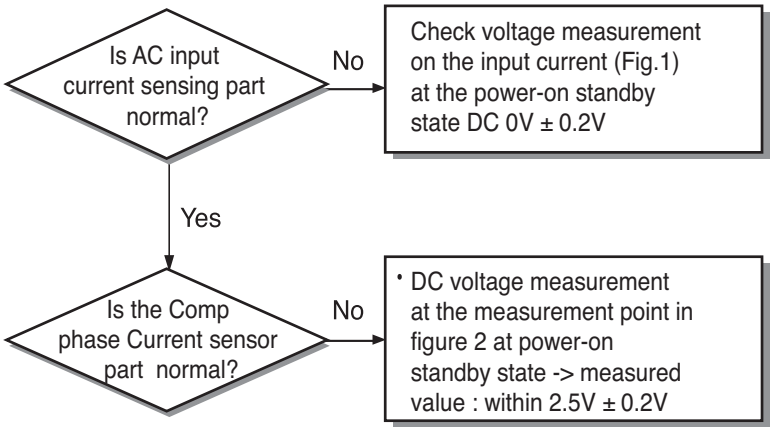
1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of 200KΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



7) CH40: CT Sensor Error (Open/Short)

Error Code	Error Detection	Cause of Error	Check Point
CH40	AC Input current / Comp phase current sensing circuit - basic voltage sensing error	• PCB sensing circuit part burned	• Check power input connector, Comp output current sensing circui

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is AC input current sensing part normal?
No
Check voltage measurement on the input current (Fig.1) at the power-on standby state DC 0V ± 0.2V
Yes
Is the Comp phase Current sensor part normal?
No
• DC voltage measurement at the measurement point in figure 2 at power-on standby state -> measured value : within 2.5V ± 0.2V

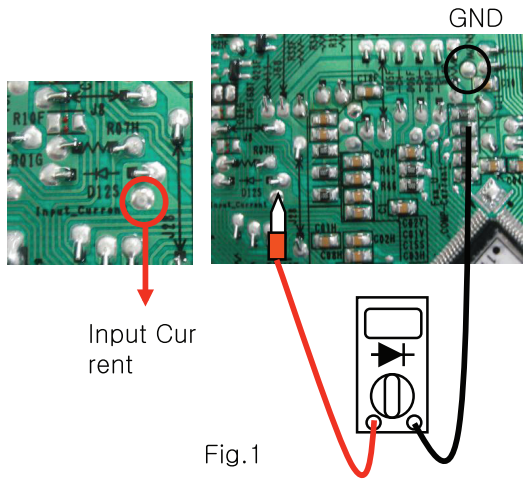


Fig.1

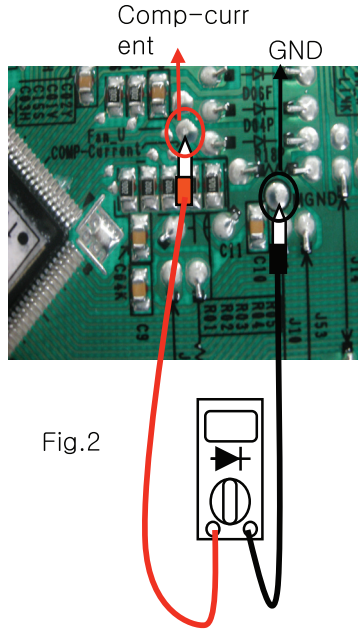
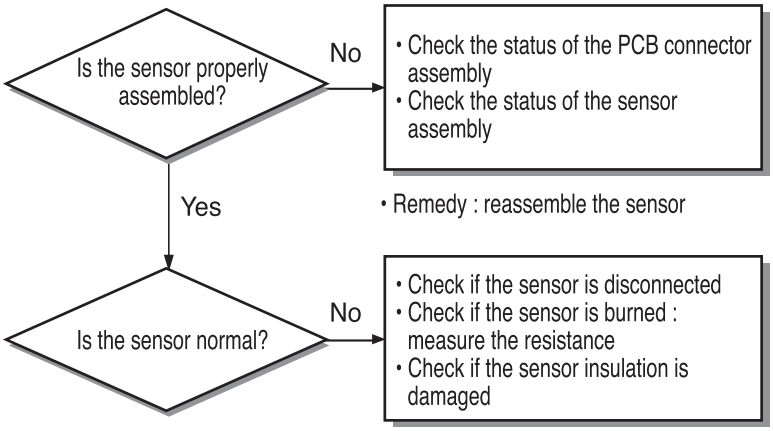


Fig.2

8) CH41/44/45/65: Inv D-Pipe/Outdoor Inlet/Cond. Pipe/Heat sink Sensor Error

Error Code	Error Detection	Cause of Error	Check Point
CH41	Inv D-Pipe sensor open/short	• Sensor displacement (poor assembly) • Sensor burned (disconnection, insulation damage)	• Check the status of sensor assembly • Check if sensor is burned
CH44	Outdoor Inlet sensor open/short		
CH45	Cond. Pipe sensor open/short		
CH65	B/Diode Heat sink sensor open/short		

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the sensor properly assembled?
No
• Check the status of the PCB connector assembly
• Check the status of the sensor assembly
Yes
• Remedy : reassemble the sensor
Is the sensor normal?
No
• Check if the sensor is disconnected
• Check if the sensor is burned : measure the resistance
• Check if the sensor insulation is damaged

• Inspecting Inverter Compressor Discharge Sensor

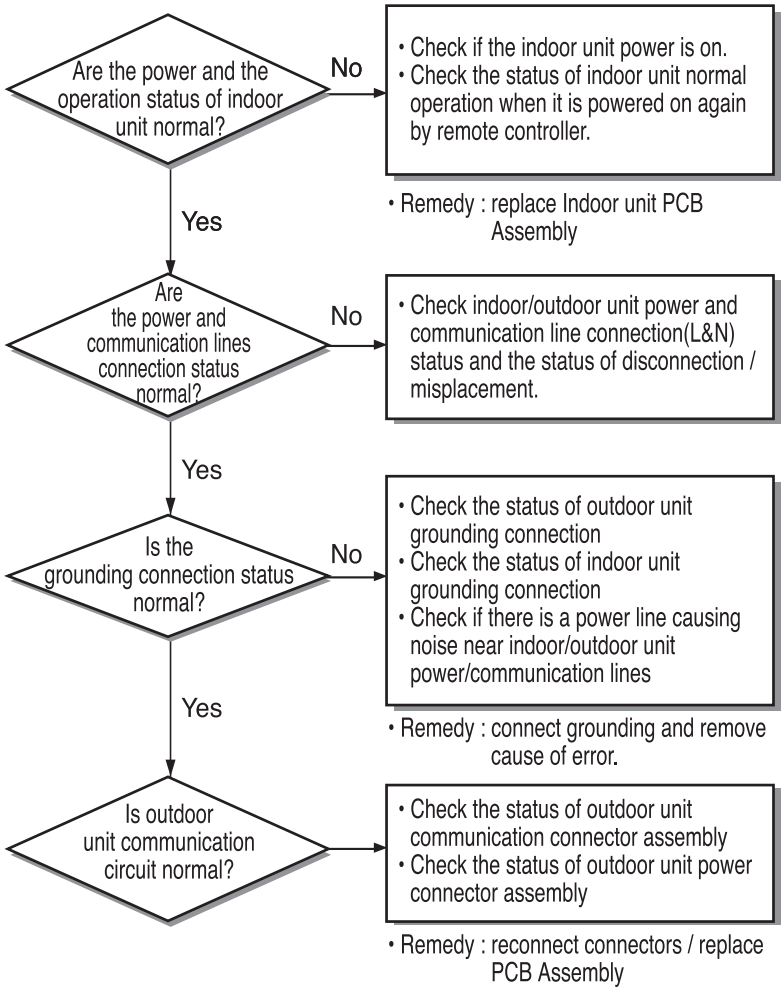
1. Set Multi-tester as resistance measurement mode.
2. Measure resistance between the sensor connectors
3. Check if the sensor insulation is damaged -> Measure resistance between sensor connector pin and the unit assembly pipe. (1MΩ or more)

Sensor Resistance Value (25°C basis)	
Inv D-Pipe Sensor	200k
Outdoor Inlet Sensor	10k
Cond. Pipe Sensor	5k
B/Diode Heat Sink Sensor	10k

9) CH53: Outdoor Unit <-> Indoor Unit Communication Error

Error Code	Error Detection	Cause of Error	Check Point
CH53	If the data transmitted by the indoor unit is not received for 3 minutes continuously.	• No power on indoor unit • Indoor/outdoor unit Power connection error / communication line not installed • Communication error caused by external noise • Indoor/outdoor unit communication circuit parts burned	• Check indoor unit power status • Check indoor/outdoor unit power/communication line disconnection • Check the status of indoor/outdoor unit ground connections • Check if outdoor unit communication parts are burned

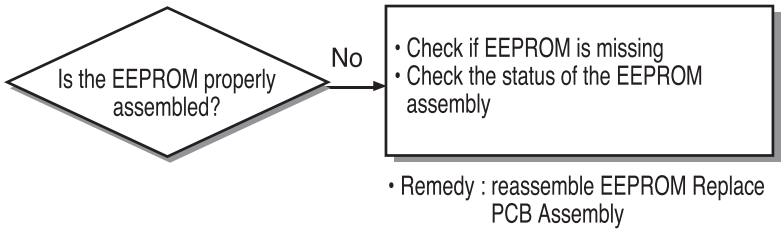
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Are the power and the operation status of indoor unit normal?
No
• Check if the indoor unit power is on.
• Check the status of indoor unit normal operation when it is powered on again by remote controller.
• Remedy : replace Indoor unit PCB Assembly
Yes
Are the power and communication lines connection status normal?
No
• Check indoor/outdoor unit power and communication line connection(L&N) status and the status of disconnection / misplacement.
Yes
Is the grounding connection status normal?
No
• Check the status of outdoor unit grounding connection
• Check the status of indoor unit grounding connection
• Check if there is a power line causing noise near indoor/outdoor unit power/communication lines
• Remedy : connect grounding and remove cause of error.
Yes
Is outdoor unit communication circuit normal?
• Check the status of outdoor unit communication connector assembly
• Check the status of outdoor unit power connector assembly
• Remedy : reconnect connectors / replace PCB Assembly

10) CH60: Outdoor Unit PCB EEPROM Error

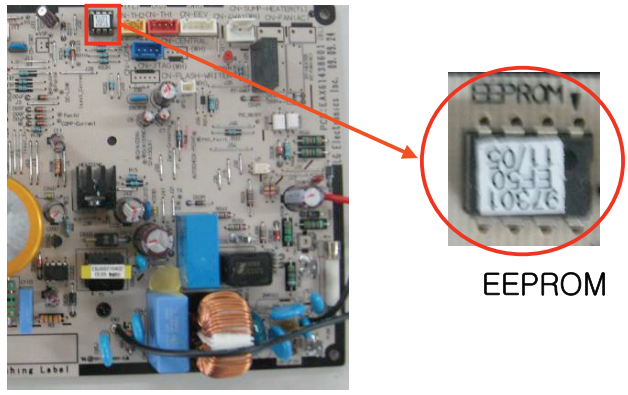
Error Code	Error Detection	Cause of Error	Check Point
CH60	Incorrect checksum of outdoor unit PCB EEPROM	• Outdoor unit PCB EEPROM misapplied • Outdoor unit PCB EEPROM poor assembly	EEPROM assembly

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is the EEPROM properly assembled?
No
• Check if EEPROM is missing
• Check the status of the EEPROM assembly
• Remedy : reassemble EEPROM Replace PCB Assembly

• Inspecting Outdoor EEPROM Assembly Status

1. Check the consistency of the EEPROM's direction inserted in the PCB and the EEPROM marking.

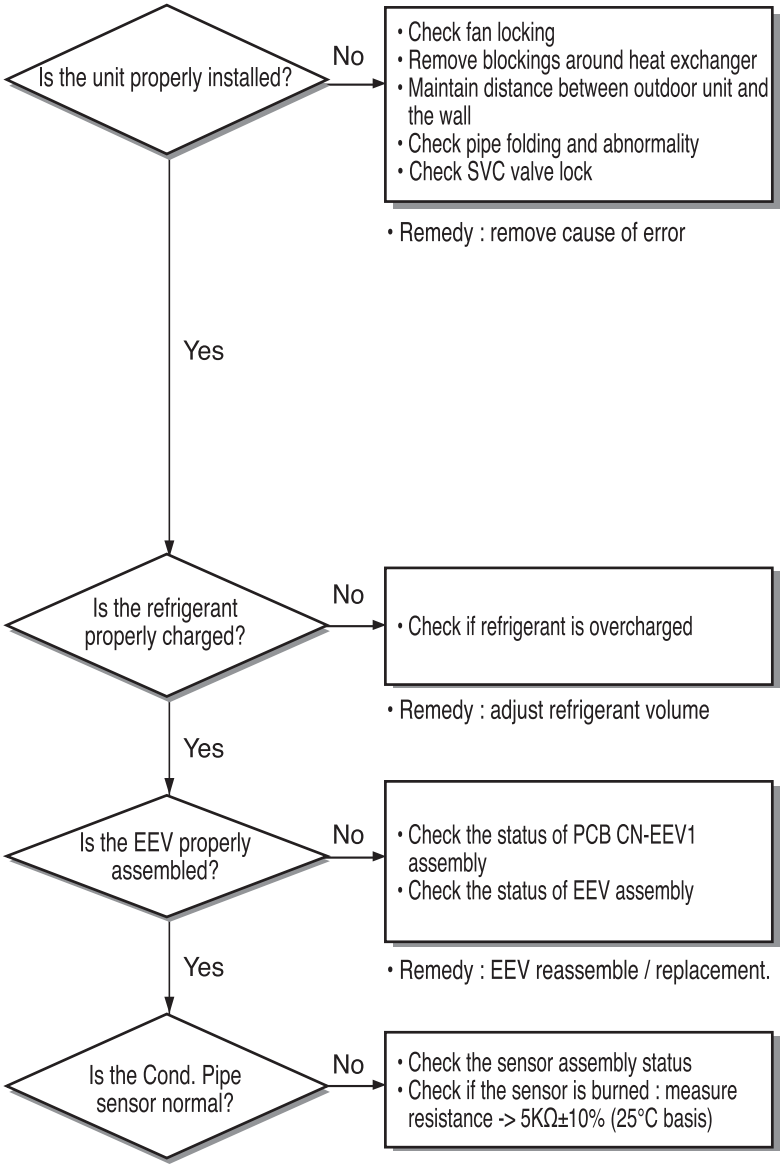


11) CH61: Cond. Pipe Overheat Error

Error Code	Error Detection	Cause of Error	Check Point
CH61	High temperature in Cond. Pipe	• Overload operation (Fan constraint, screened, blocked) • Heat exchanger contaminated • EEV connector displaced / poor EEV assembly • Poor Cond. Pipe sensor assembly / burned	• Check fan constraint / screened / flow structure • Check if refrigerant overcharged • Check the status of EEV assembly • Check the status of sensor assembly / burn

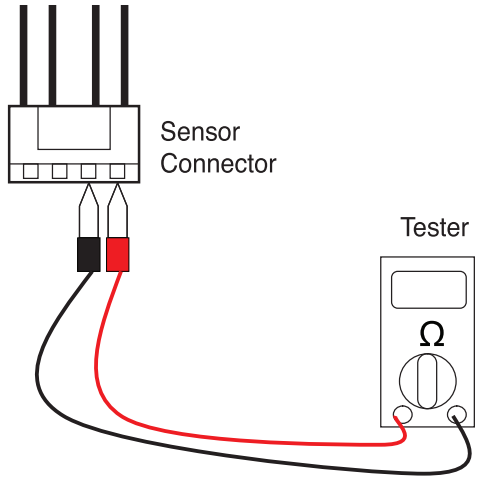
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.


Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check SVC valve lock
• Remedy : remove cause of error
Yes
Is the refrigerant properly charged?
No
• Check if refrigerant is overcharged
• Remedy : adjust refrigerant volume
Yes
Is the EEV properly assembled?
No
• Check the status of PCB CN-EEV1 assembly
• Check the status of EEV assembly
• Remedy : EEV reassemble / replacement.
Yes
Is the Cond. Pipe sensor normal?
No
• Check the sensor assembly status
• Check if the sensor is burned : measure resistance -> 5KΩ±10% (25°C basis)

• Inspecting Cond. Pipe Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between rated speed Comp Discharge sensor connector pins.
3. Measure resistance value of 5kΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)

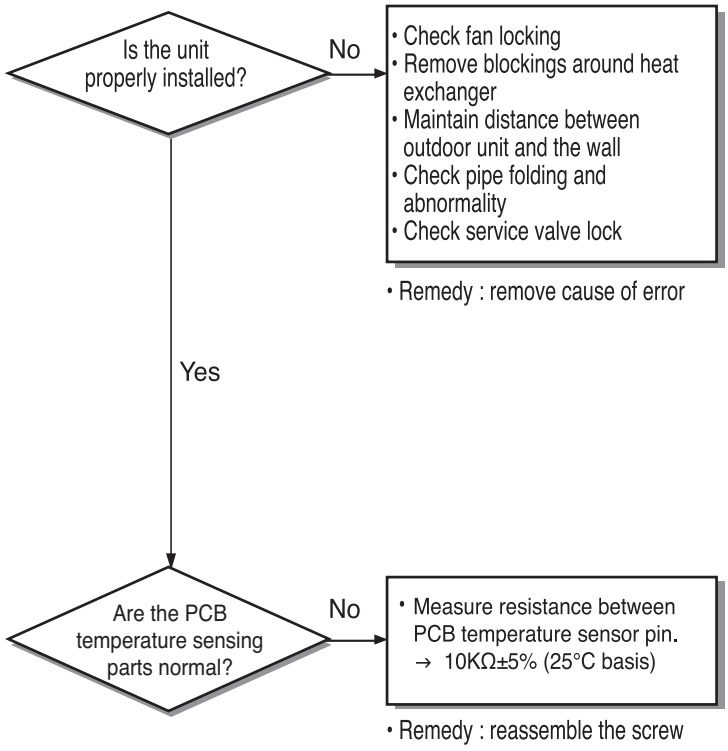


12) CH62: Heat Sink Overheat Error

Error Code	Error Detection	Cause of Error	Check Point
CH62	High temperature in outdoor PCB Heat Sink	• Overload operation (Outdoor fan constraint, screened, blocked) • Poor PCB Heat Sink assembly • Poor PCB temperature sensing circuit parts	• Check outdoor fan constraint / screened / flow structure • Check for the status of the PCB Heat sink connection • Check PCB temperature sensing parts

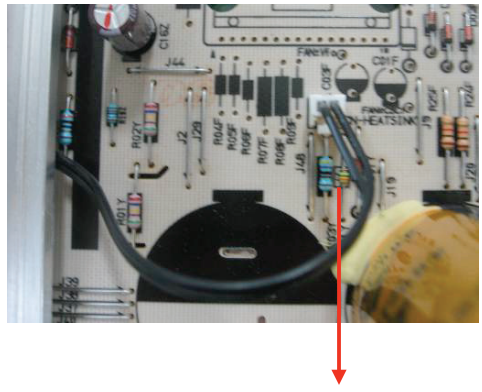
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

caution Check that whether the housings and harness would be separated by pulling those with hands directly.

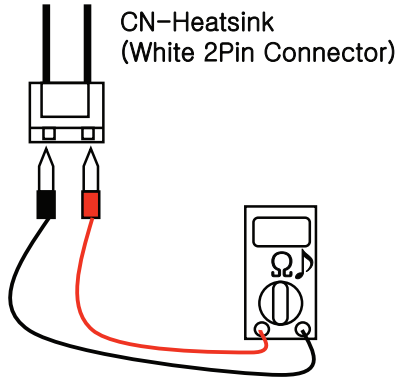

Is the unit properly installed?
No
• Check fan locking
• Remove blockings around heat exchanger
• Maintain distance between outdoor unit and the wall
• Check pipe folding and abnormality
• Check service valve lock
• Remey : remove cause of error
Yes
Are the PCB temperature sensing parts normal?
No
• Measure resistance between PCB temperature sensor pin.
→ 10KΩ±5% (25°C basis)
• Remedy : reassemble the screw

Inspecting PCB temperature sensing part

1. Set Multi-tester as resistance measurement mode.
2. Measure resistance between Heatsink temperature sensor pin.
3. Measured resistance value of 10KΩ±5%, 25°C basis



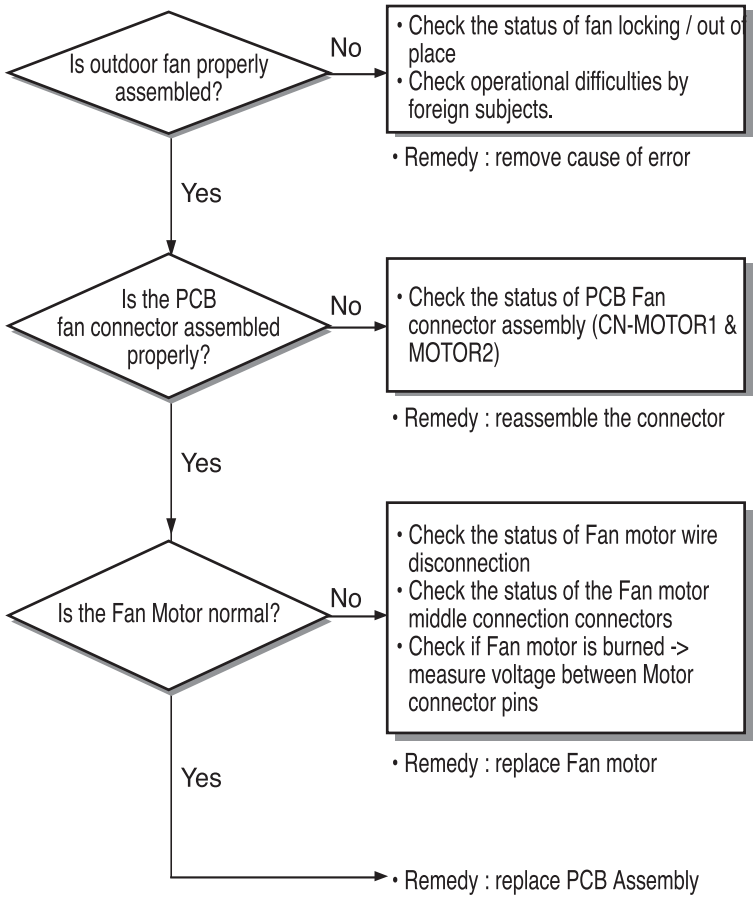
Heatsink temperature s ensor



13) CH67: Outdoor BLDC Fan Lock Error

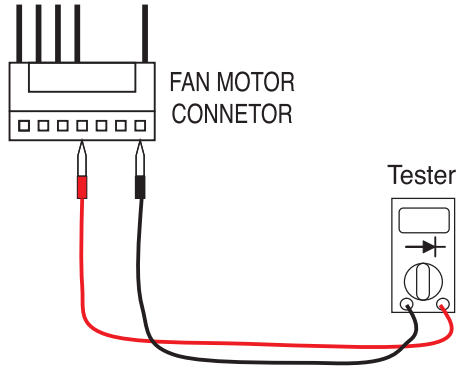
Error Code	Error Detection	Cause of Error	Check Point
CH67	The outdoor unit BLDC Fan operation F/Back signal does not come on	• Outdoor BLDC Fan Lock • PCB Fan connector displaced • BLDC Fan motor burned / wire disconnected • PCB BLDC Fan operation circuit burned	• Check for the status of outdoor fan assembly • Check for the status of the PCB Fan connector assembly • Check Fan motor wire disconnection • Check if Fan motor burned

warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.


Is outdoor fan properly assembled?
No
• Check the status of fan locking / out of place
• Check operational difficulties by foreign subjects.
• Remedy : remove cause of error
Yes
Is the PCB fan connector assembled properly?
No
• Check the status of PCB Fan connector assembly (CN-MOTOR1 & MOTOR2)
• Remedy : reassemble the connector
Yes
Is the Fan Motor normal?
No
• Check the status of Fan motor wire disconnection
• Check the status of the Fan motor middle connection connectors
• Check if Fan motor is burned -> measure voltage between Motor connector pins
• Remedy : replace Fan motor
Yes
• Remedy : replace PCB Assembly

• Inspecting Outdoor BLDC Fan Motor burn

1. Set Multi-tester as Diode voltage measurement mode.
2. Measure voltage between Fan motor connector pin 1 and pin 4 at power off state.
3. Measured voltage value of 1V ± 0.2V means the motor is internally burned.



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